Rail Baltica

#StandWithUkraine

BIM integrācija projektēšanā no pasūtītāja skatu punkta

Raitis Bušmanis
Virtuālās projektēšanas un būvniecības departamenta vadītājs, RB Rail AS

Co-financed by the Connecting Europe Facility of the European Union

Kas ir Rail Baltica?

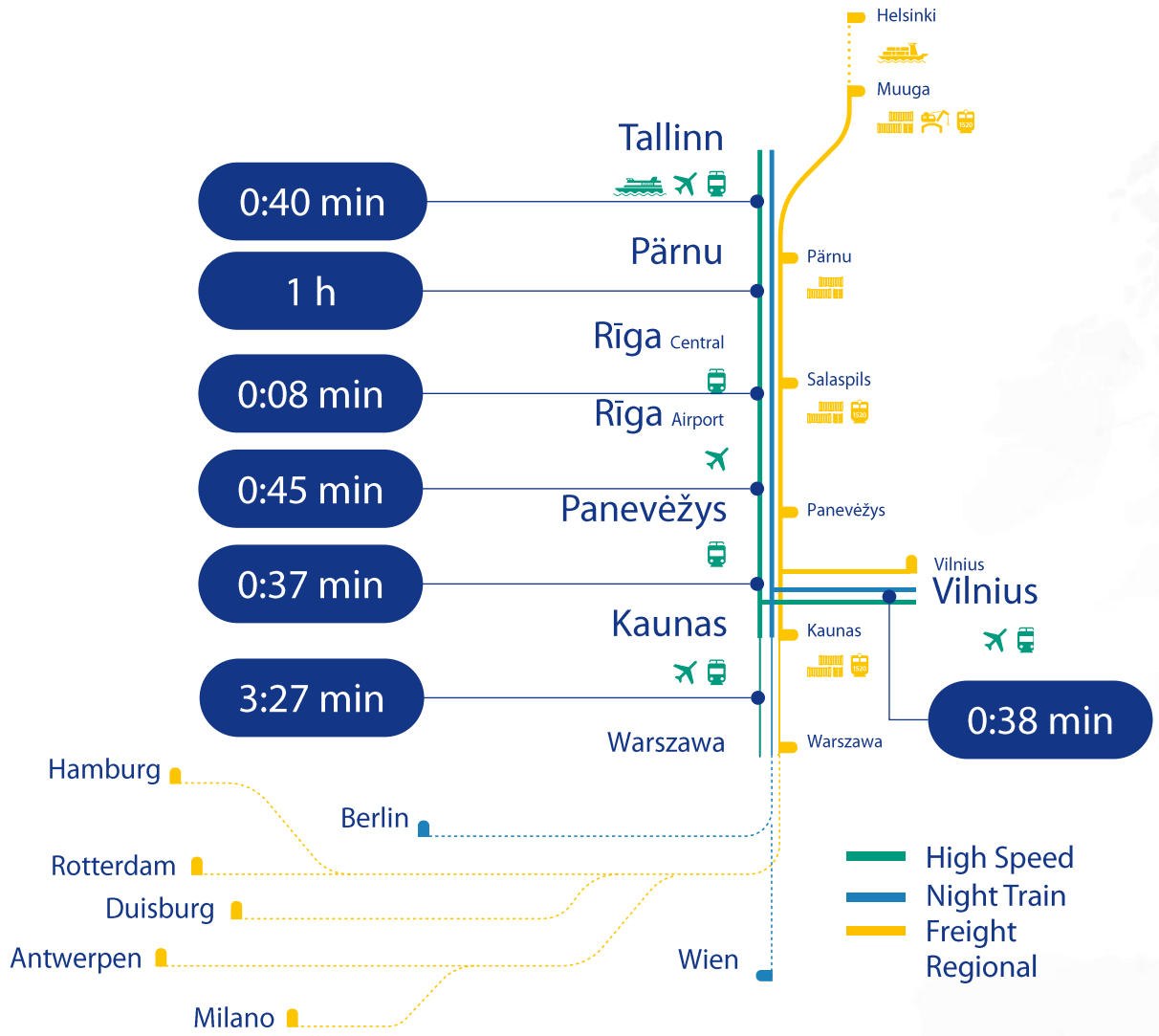
Rīga Central Station

Rail Baltica is a MEGAPROJECT


Riga Central Station

- ✓ Huge economic size
- ✓ Long time commitment
- ✓ Impact on context
- ✓ Risk, uncertainty and complexity
- ✓ Complex stakeholder management
- ✓ Megaprojects are programs

Basis for new economic corridor and military mobility



870 km greenfield railway infrastructure

1435 mm Double track

ERTMS Level 2 + FRMCS*

Electrified 2x25kV AC

Maximum length of freight trains: 1050m

Axle load 25t

Design speed:
249 km/h for passenger trains
120 km/h for freight trains

SE-C (Swedish) loading gauge

Rail Baltica

Co-financed by the Connecting Europe Facility of the European Union

A truly European project (with 150+ partners)

- ✓ More than 150 active contracts with total value above 900 MEUR. Over 50 international partnerships - European industry strongly represented

LOGISTIIKKA SISÄLOGISTIIKAN AMMATTIMESSUT

INFRARAIL RAILTEX

RailTech EUROPE UTRECHT 22 ProRail

TRAKO 21-24.09.2021

Rail Baltica INDUSTRY DAY

RAILLIVE!

InnoTrans

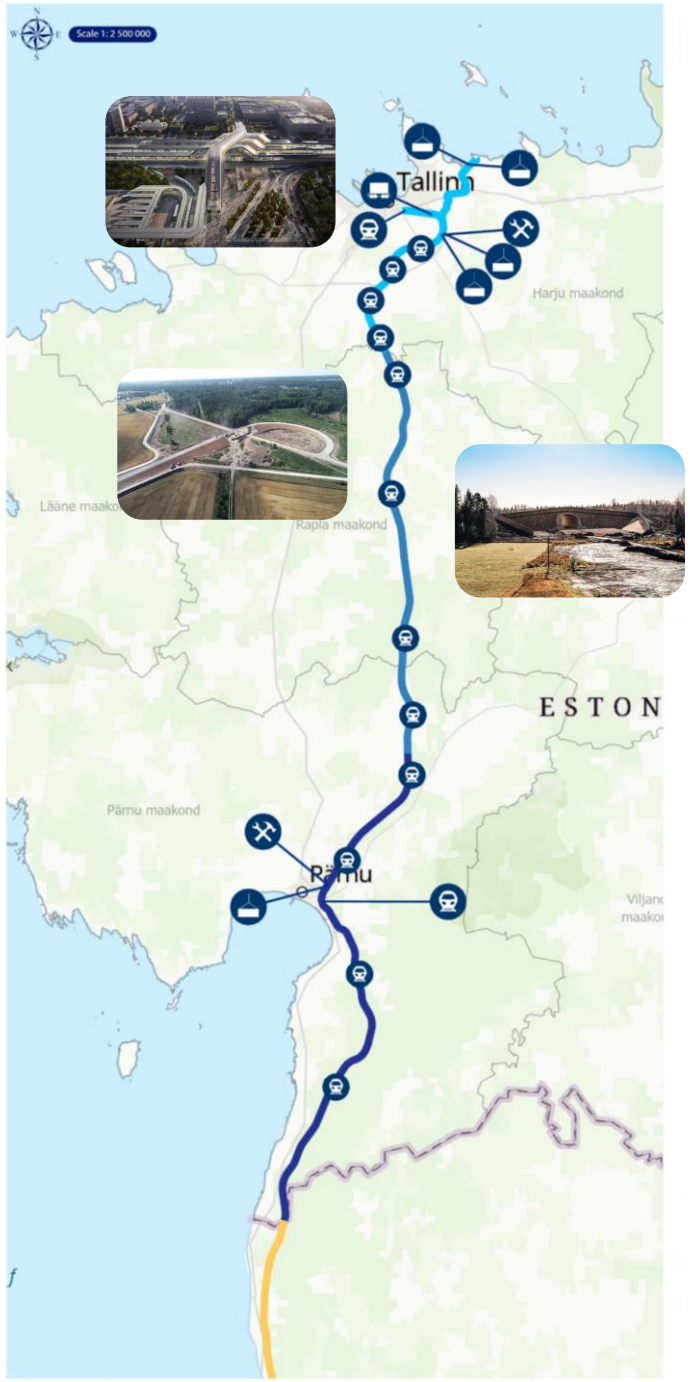
transport logistic the leading exhibition

ELMIA NORDIC RAIL

International Railway Summit

Co-financed by the Connecting Europe Facility of the European Union

Progress Igaunijā



Plānošana un projektēšana

- Turpinās **visas pamattrases projektēšanas** darbi, kā arī pasažieru un kravu terminālu projektēšana
- Parakstīts līgums **Igaunijas reģionālo staciju projektēšanai**
- **Atsavināti 389 zemes gabali ~40 %**
- Tiek veikts **ietekmes uz vidi novērtējums** visā Igaunijas trases posmā. Pabeigti pirmie 3 ziņojumi no plānotajiem 8.

Būvniecība (t.sk. iepirkumi)

- Uzsākta **dzelzceļa infrastruktūras būvniecība** Ülemiste
- **Izsludināti būvniecības darbu iepirkumi Harju/Raplas apriņķa robežas un Ülemiste – Lagedi posmiem**
- Mērķis 2023. gadā uzsākt būvniecību ~40 km pamattrases
- Uzsākti 8 ceļu pārvadu un ekoduktu būvniecības iepirkumi; **uzbūvēti 3 Rail Baltica pārvadi Raplas novadā**
- **Assaku ceļa viadukta** atklāšana Tallinas-Tartu šosejas krustojumā

Darbu progress Latvijā

Plānošana un projektēšana

- Turpinās **pamattrases projektēšana**
- Uzsākta **infrastruktūras uzturēšanas un apkopes punktu (Skultē un Iecavā) projektēšana**
- Uzsākta **Rail Baltica Salaspils Intermodālā kravu termināļa būvprojekta izstrāde**
- Norit **projektēšanas** darbi **16 reģionālajiem mobilitātes punktiem**
- Apstiprināta **ritošā sastāva depo** atrašanās vieta, plānots izsludināt projektēšanas iepirkumu
- Izstrādāti **apvienotā dzelzceļa un autoceļa tilta pār Daugavu** būvprojekta pamatrisinājumi
- Saņemti **vairāk nekā 20 būvprojekta pamatrisinājumi** trases posmiem

Būvniecība (t.sk. iepirkumi)

- Aktīva **būvniecība Rail Baltica Centrālās stacijas** un **Starptautiskās lidostas 'Rīga' posmos**
- **Pamattrases būvniecības iepirkums noslēguma stadijā** (aptuveni 200km no Rail Baltica pamattrases)

Progress Lietuvā

Plānošana un projektēšana

- Pabeigta zemju atsavināšana Kauņas – LT/LV pārrobežu posmam*
- Starptautiskās pasažieru stacijas/termināli (t.sk. noslēdzies *Vilnius Connect* starptautiskais arhitektūras konkurss)
- Reģionālās pasažieru stacijas/pieturas
- Kravu termināli
- Infrastruktūras uzturēšanas punkts

Būvniecība (t.sk. iepirkumi)

- Uzsākta tilta pār Neres upi (Baltijā garākā) būvniecība
- Plānots uzsākt *Šėta-Žeimiai* un *Žeimiai-Šveicarija* uzbēruma izbūvi
- Notiek *Šveicarija-Kaunas* un *Ramygala-Šėta* uzbēruma izbūves iepirkums

*Likumprojekts, kas atļautu projektēšanu un zemju atsavināšanas paralēlu norisi, noslēdzošajā posmā

Challenges of Multiple Jurisdictions

Data Packages

- 3 mainline design sections / 12 mainline design priority sections
- 4 mainline design sections / 15 mainline design priority sections
- 5 mainline design sections / >8 mainline design priority sections

Various Coordinate Systems

- WGS 1984 (World Geodetic System)
- ETRS 1989 LAEA (European Terrestrial Reference System)
- Estonia 1997 Estonia National Grid
- LKS 1992 Latvia TM
- LKS 1994 Lithuania TM

Various Chainages

- Global Chainage
- Operational Plan Chainage
- Country-based Chainages
- Design Priority Sections Chainages
- Spatial Planning Chainages

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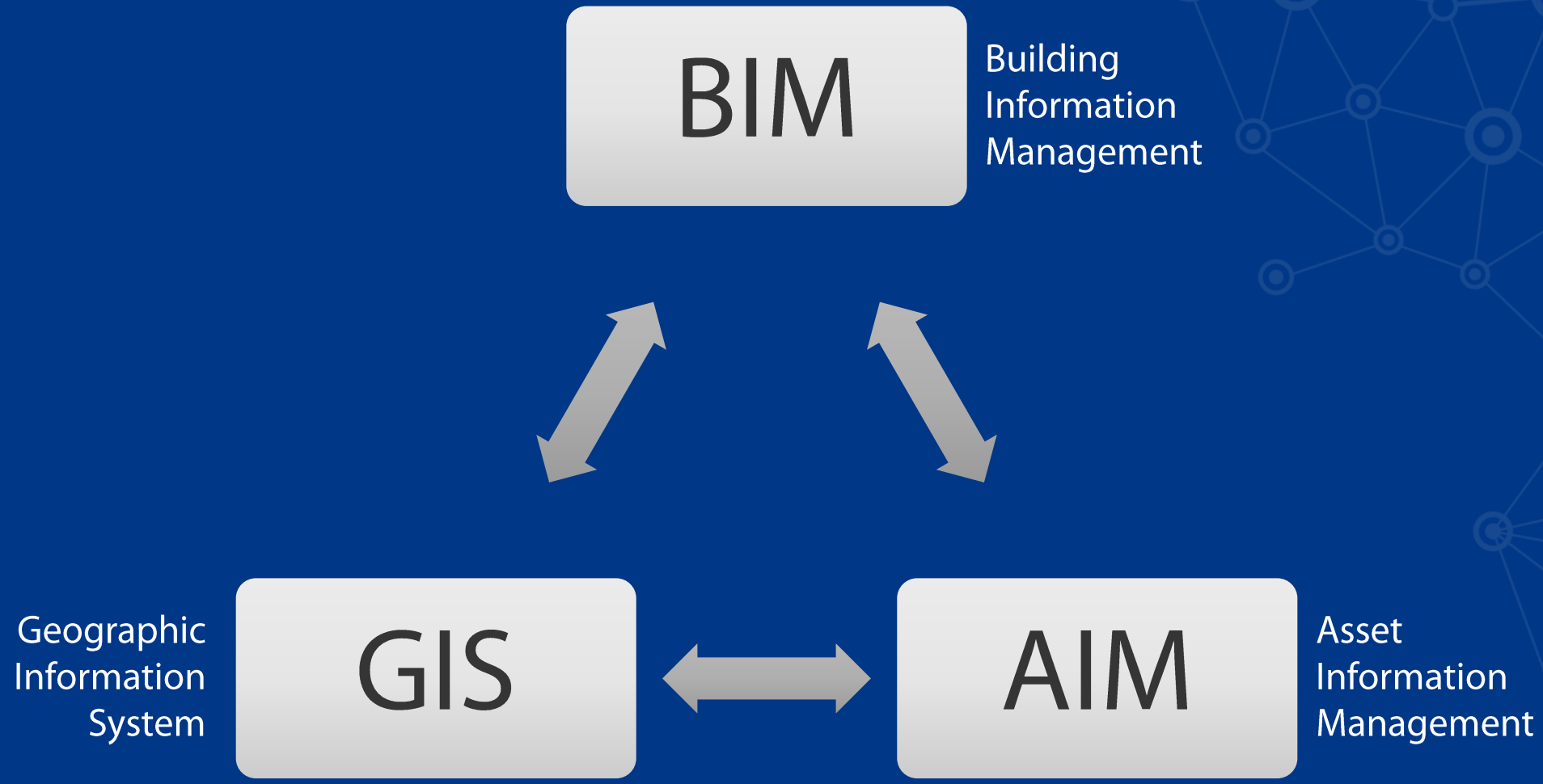
Digitalizācija
Pärnu reisiterminali ideelahendus: AB PLUSS OÜ


BIM
Building
Information
Management
Geographic
Information
System
GIS
AIM
Asset
Information
Management

BIM?

Building Information Management (Modeling)

BIM ietver sevī ģeometriju, telpiskās sakarības, ģeogrāfisko informāciju, būves daļu kvantitāti un rekvizītus (ražotāju detaļas u.c.). BIM var izmantot, lai atainotu visu būves pastāvēšanas ciklu, ieskaitot būvniecības procesu, ekspluatēšanu, apsaimniekošanu un demontžu

ĢIS?

Ģeogrāfiskā Informācijas Sistēma

Ģeogrāfiskā informācijas sistēma (ĢIS) ir ar ģeogrāfiju saistītu datu uzglabāšanai, atjaunošanai, analīzei un attēlošanai izveidots tehnoloģiju kopums.

...

ĢIS var plaši izmantot dažādu nozaru uzņēmumi un organizācijas, piemēram, pašvaldības, inženierkomunikāciju, transporta, telesakaru, medicīnas u.c. organizācijas.

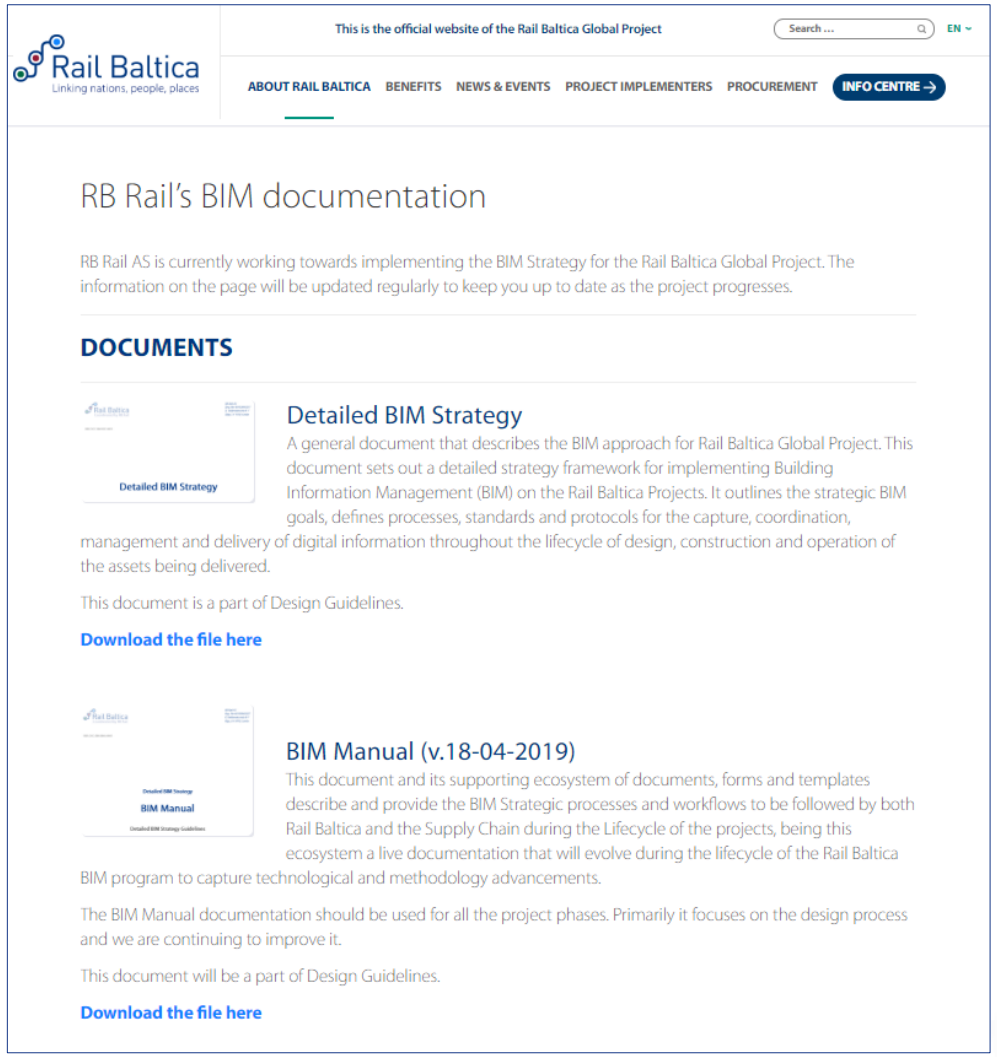
https://lv.wikipedia.org/wiki/Ģeorafiskā_informācijas_sistēma

AIM?

Asset Information Mangement

Aktīvu informācijas vadības sistēma nodrošina pārbaudītu un apstiprinātu datu pieejamību un pareizību, kas tiek izmantoti būves dzīves cikla laikā – projektēšanā, būvniecība un uzturēšanā.

BIM requirements



Rail Baltica
Linking nations, people, places

This is the official website of the Rail Baltica Global Project

Search ... EN

ABOUT RAIL BALTICA | BENEFITS | NEWS & EVENTS | PROJECT IMPLEMENTERS | PROCUREMENT | INFO CENTRE →

RB Rail's BIM documentation

RB Rail AS is currently working towards implementing the BIM Strategy for the Rail Baltica Global Project. The information on the page will be updated regularly to keep you up to date as the project progresses.

DOCUMENTS

Detailed BIM Strategy

Detailed BIM Strategy

A general document that describes the BIM approach for Rail Baltica Global Project. This document sets out a detailed strategy framework for implementing Building Information Management (BIM) on the Rail Baltica Projects. It outlines the strategic BIM goals, defines processes, standards and protocols for the capture, coordination, management and delivery of digital information throughout the lifecycle of design, construction and operation of the assets being delivered.

This document is a part of Design Guidelines.

Download the file here

BIM Manual

BIM Manual (v.18-04-2019)

This document and its supporting ecosystem of documents, forms and templates describe and provide the BIM Strategic processes and workflows to be followed by both Rail Baltica and the Supply Chain during the Lifecycle of the projects, being this ecosystem a live documentation that will evolve during the lifecycle of the Rail Baltica BIM program to capture technological and methodology advancements.

The BIM Manual documentation should be used for all the project phases. Primarily it focuses on the design process and we are continuing to improve it.

This document will be a part of Design Guidelines.

Download the file here

Building Information Management (BIM) Employer's Information Requirements

Building Information Management (BIM) Employer's Information Requirements v2.1

This document sets the requirements according to which the supply chain shall work with BIM systems in order to deliver information to Client – RB Rail or National Implementing Bodies.

This document is a part of Design Guidelines.

Download the file here

CAD Standard

CAD Standards

These standards apply to all drawings (sketches, preliminary, detailed design, construction, shop drawings and asbuilt drawings) and CAD Data (2D or 3D) produced. The intent of these CAD standards is to provide guidelines to ensure that all drawings are prepared to a standard and uniform appearance and reflect high quality workmanship, and that data created by CAD systems is correctly structured and classified to facilitate re-use and understanding by others. This document is not related to any particular Authoring Tool and it will be each Supplier who develops a specific practical standardization for the Authoring Tool to be used in their project, taking as a base this documentation.

This document will be a part of Design Guidelines.

Download the file here

BIM Execution Plan

BEP Template

This BIM Execution Pland (BEP) template has been elaborated to be used as the basis for the post-contract BEP. It has to be prepares as a direct response to the BIM EIR and Technical Specifications. The Supplier shall fulfill all the required information in order to show their intention to comply with all the standards and procedures described in the BIM Manual. The Supplier is free to add extra information.

This document is a part of Design Guidelines.

Download the file here

http://www.railbaltica.org/design-guidelines

BIM ieviešana normatīvajos aktos Latvijā

Ekonomikas ministrija

Brīvības iela 55, Rīga, LV-1519, tālr. 67013100, fakss 67280882, e-pasts pasts@em.gov.lv, www.em.gov.lv

Rīgā

Datums skatāms laika zīmogā Nr. 3.3-6/2023/434N

Pēc pievienotā saraksta

Par BIM prasību ieviešanu normatīvajā regulējumā

BIM ieviešanas normatīvajā regulējumā koncepts:

Grozījumi Ministru kabineta 2014.gada 2.septembra noteikumos Nr.529 "Ēku būvnoteikumi":

1. BIM tiek noteikts kā obligāti izstrādājama būvprojekta daļa 3. grupas ēku jaunai būvniecībai. BIM nepieciešams izstrādāt arhitektūrai, būvkonstrukcijām un visām iekšējām inženiersistēmām (apkure, ventilācija, ūdensapgāde un kanalizācija, gāzes apgāde, elektroapgāde, elektroniskos sakaru un sistēmas un tīkli, ugunsaizsardzības sistēmas u.c.).

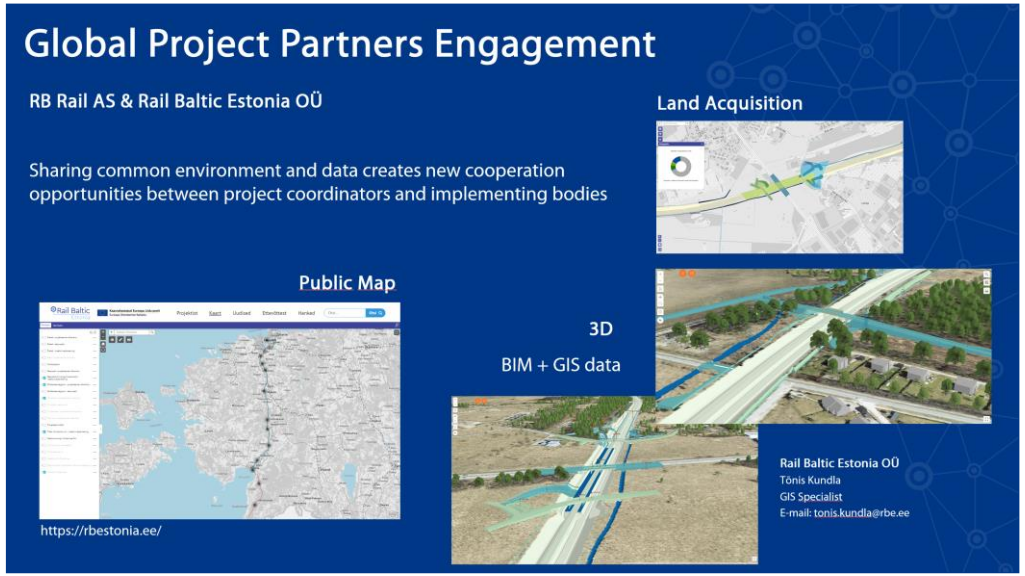
Jauns būvnormatīvs par BIM izstrādes procesu un modeļu kvalitāti un modeļos iekļaujamās informācijas apjomu:

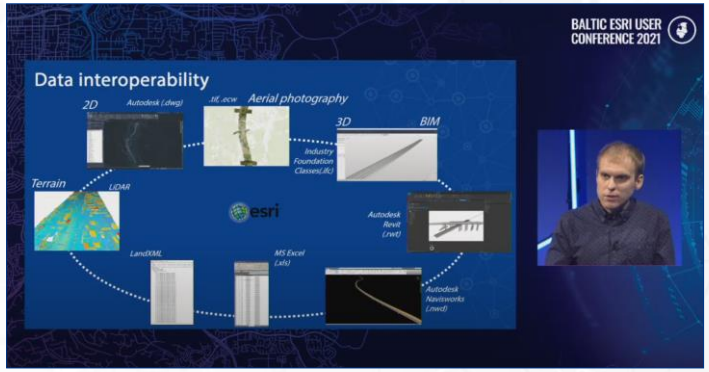
https://www.em.gov.lv/lv/buvniecibas-informacijas-modelesana-bim

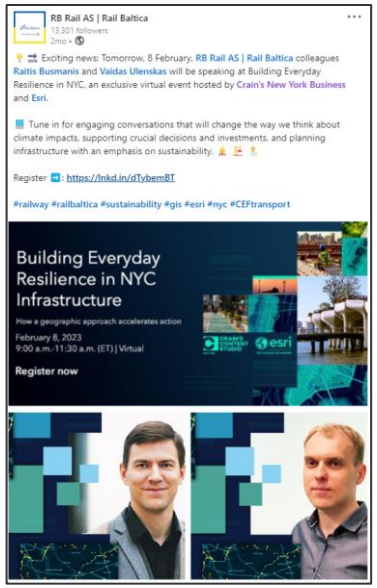
Rail Baltica Academy

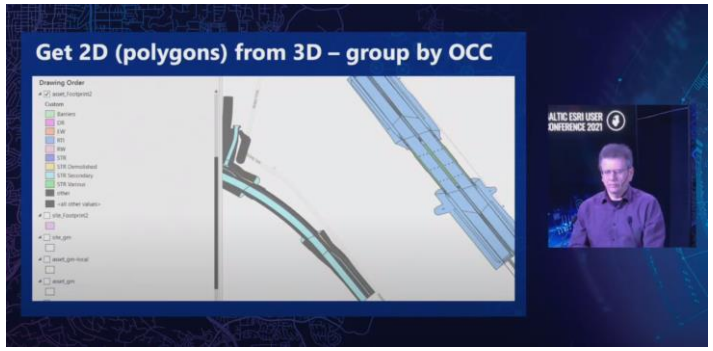
- Rail Baltica Academy – public knowledge sharing platform for STEM students and general public
- 7 public lectures on environmental sustainability, railway and airport interoperability, BIM and standards, infrastructure objects in Rail Baltica and other topics available online at: www.railbaltica.org/rail-baltica-academy
- Over 20 different lectures as a part of Rail Baltica Academy's Autumn session, starting in November 2021

GIS Development at Rail Baltica: What Solutions are in Place and What Lies Ahead









https://youtu.be/TtR5oAuyo7g

Baltic Esri User Conference

Rail Baltica

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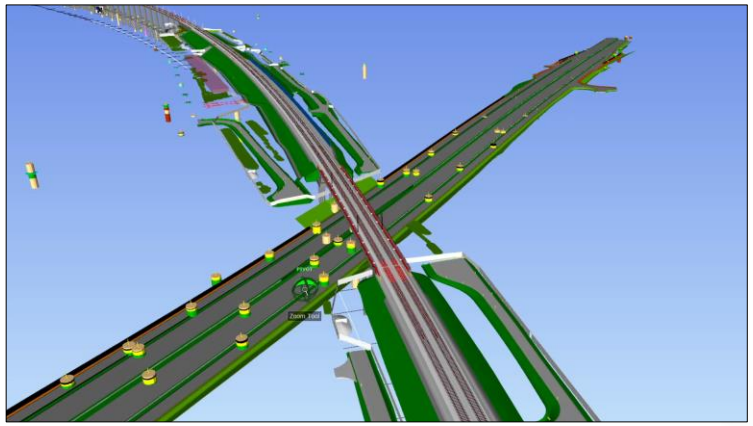
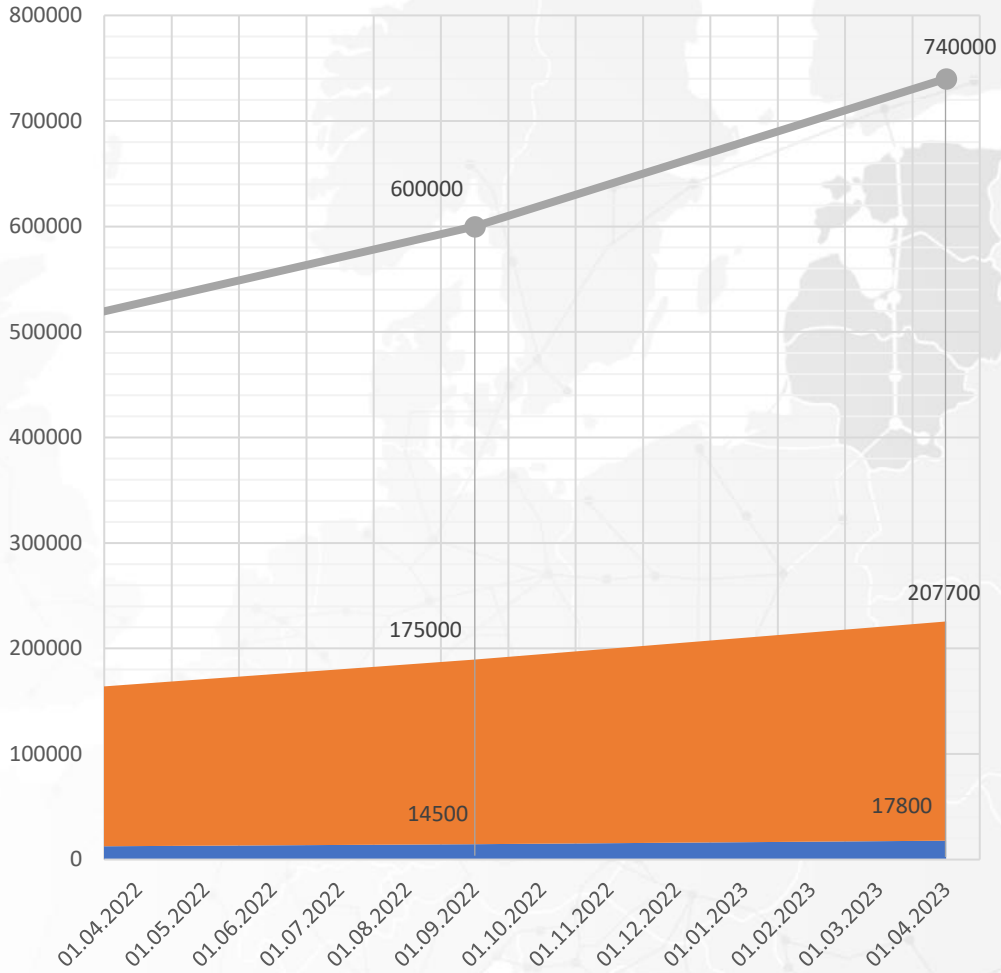
Some general numbers

BIM models (*.IFC) ~17 800

Drawings (*.dwg/*.dgn) ~207700

Documents – more than 740 000



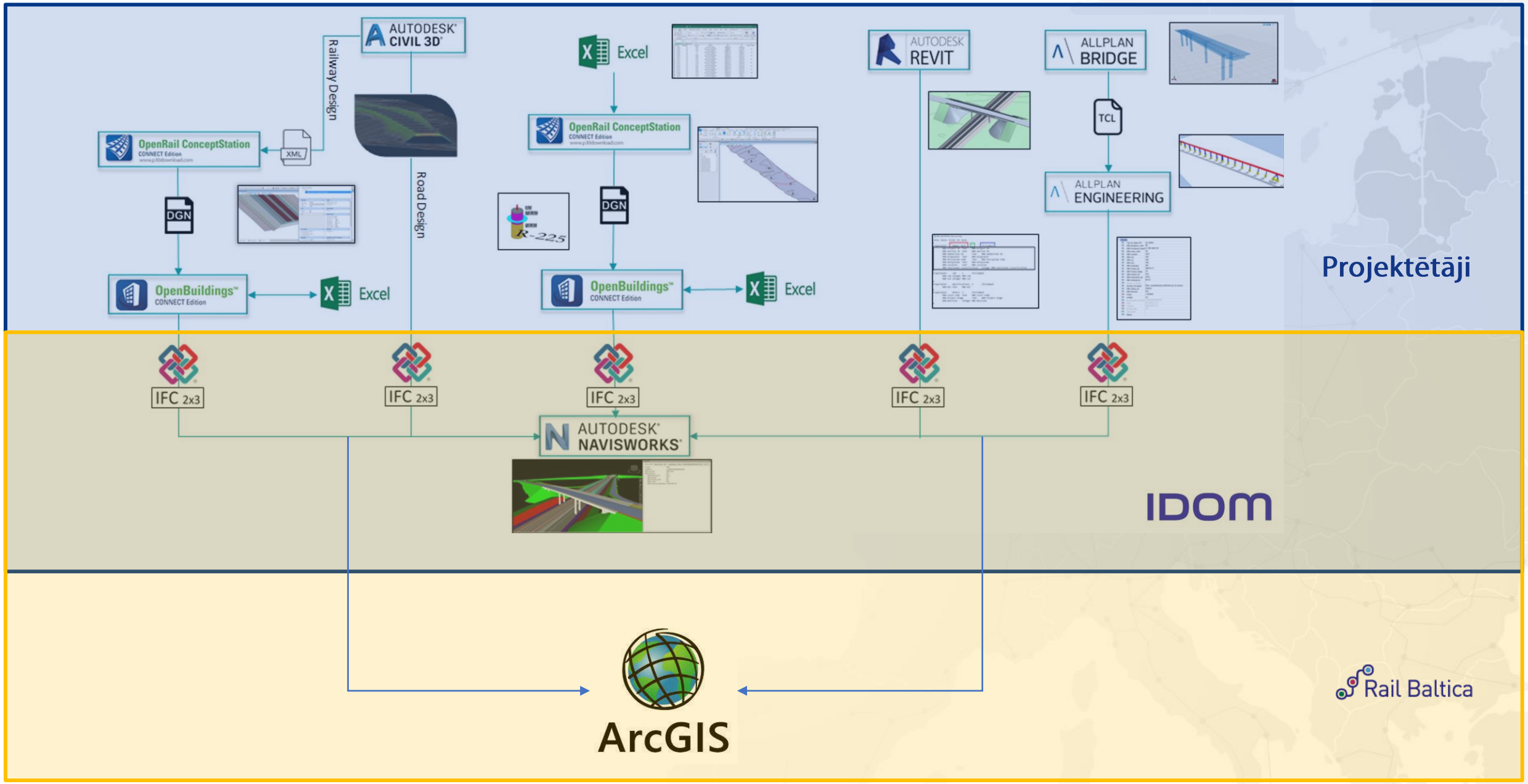


…and counting!

Data captured: 2022-09-21, 2023-04-19

PW data source, versions included

Atribūtu informācija BIM modeļos

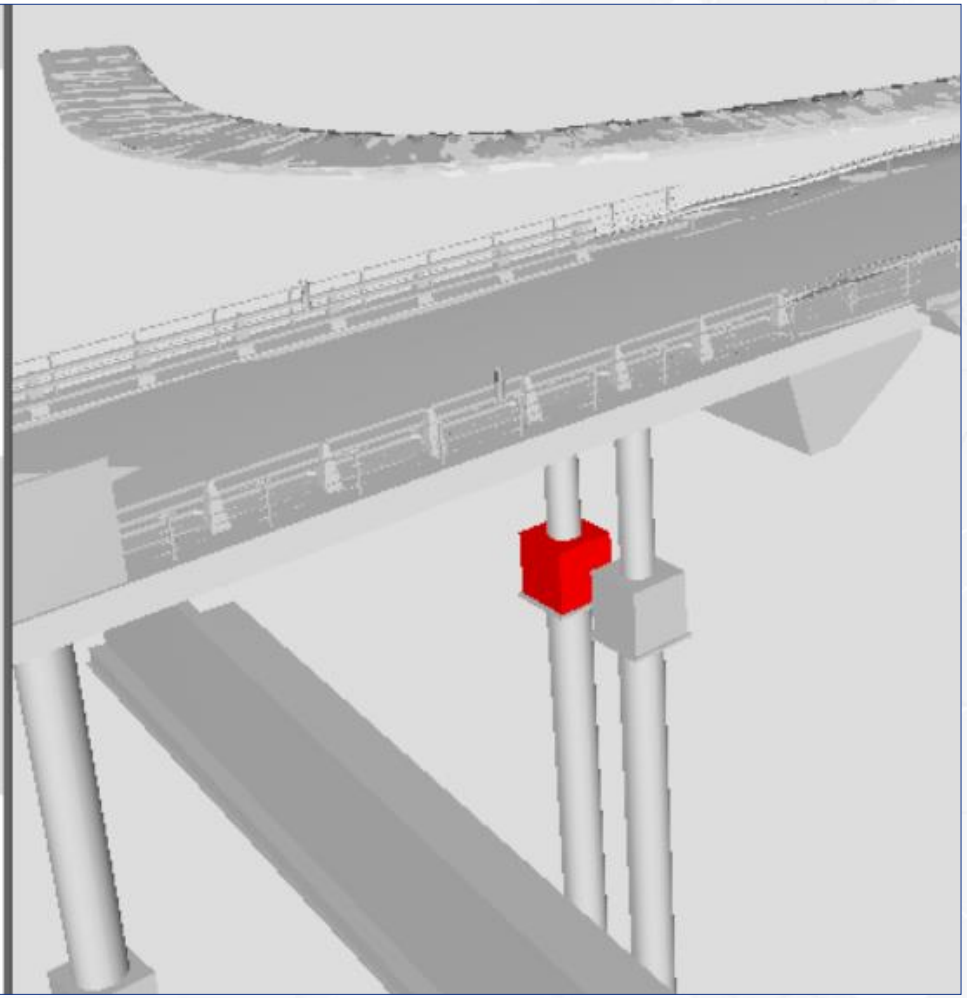


IFC model with required attributes

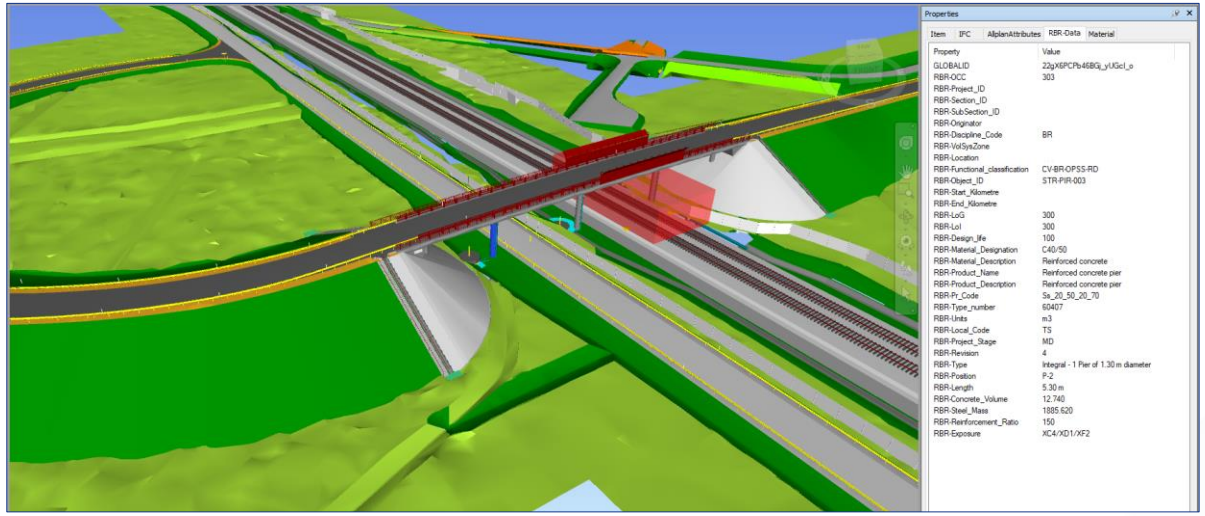
Properties: Building Element Proxy (1 of 172) - filtered

rbr | Value Type

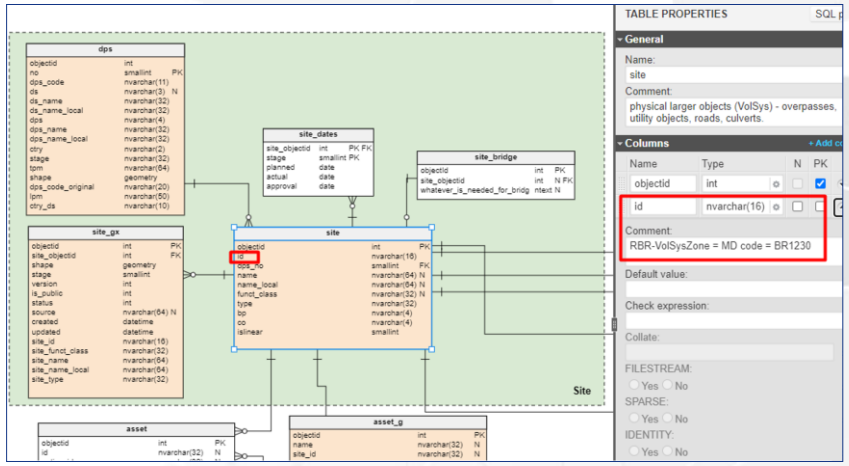
RBR-Exposure	XC2
RBR-Functional_classification	CV-BR-OPSS-RD
RBR-IsTemplate	<no value>
RBR-Length	<no value>
RBR-Local_Code	TS
RBR-Location	0009
RBR-LoG	300
RBR-LoI	300
RBR-Material_Description	Reinforced Concrete
RBR-Material_Designation	C30/37
RBR-Native_Unique_ID	<no value>
RBR-Number	<no value>
RBR-Object_ID	STR-FND-006
RBR-OCC	307
RBR-Originator	IDO
RBR-Position	A-2
RBR-Pr_Code	N/A
RBR-Product_Description	N/A
RBR-Product_Name	N/A



IFC -> Asset Register in ArcGIS

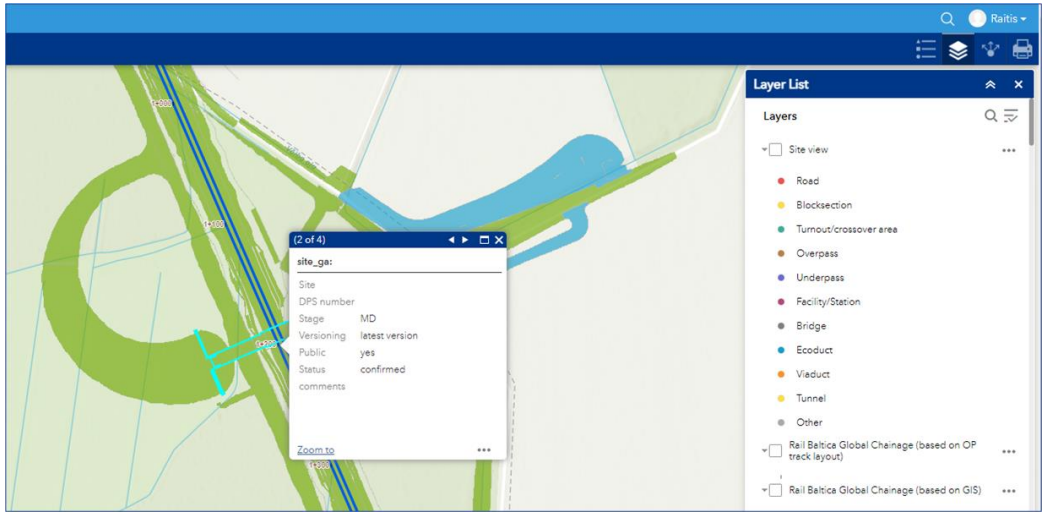


IFC

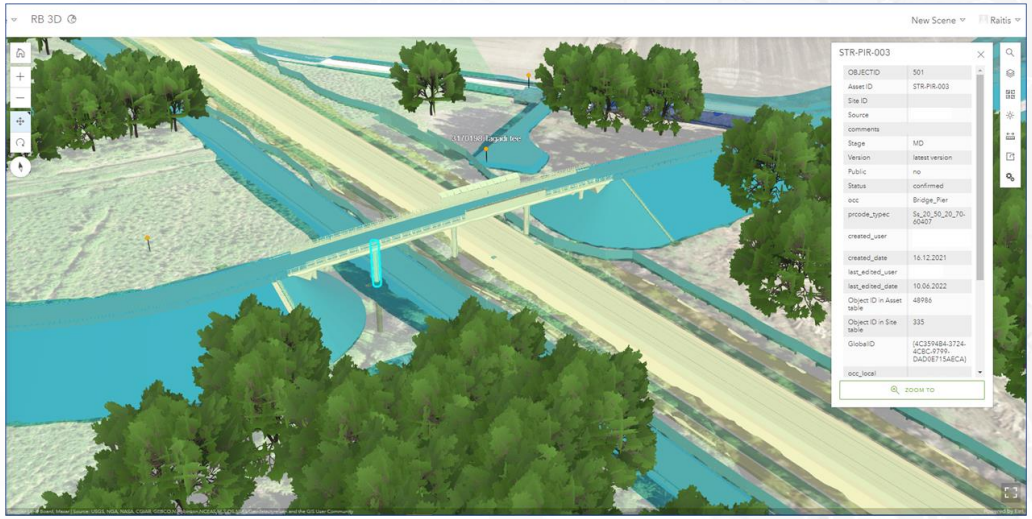


Web interface

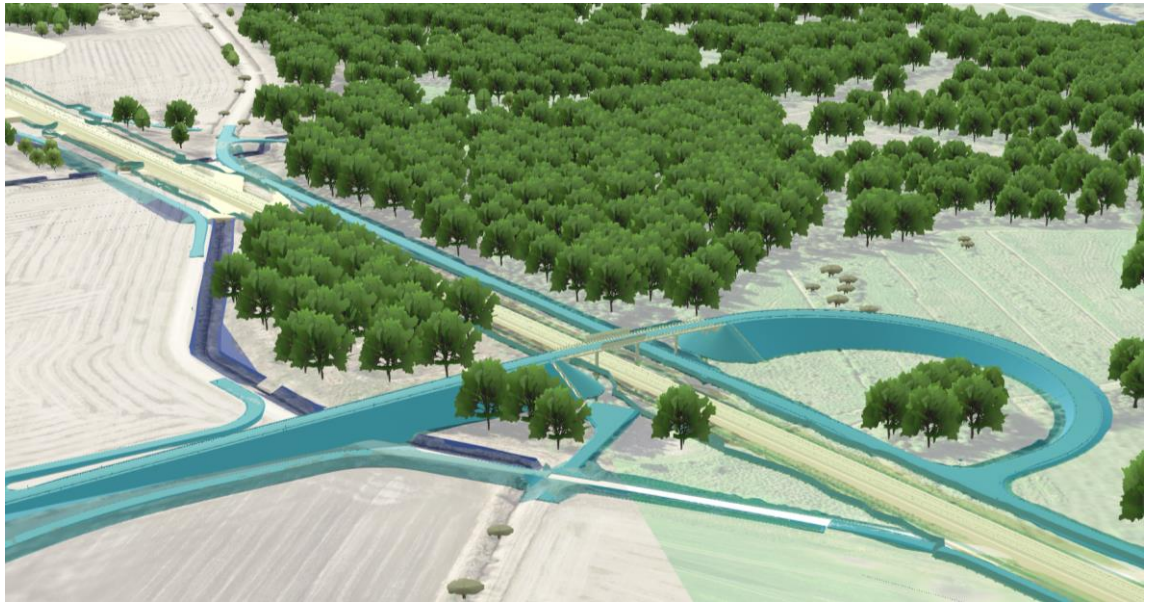
2D footprint

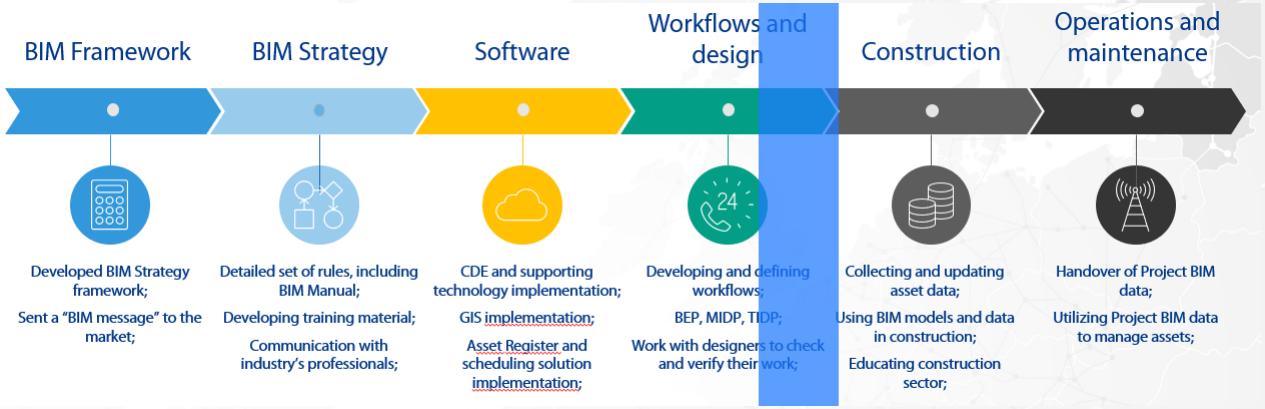


3D representation



Rail Baltica – Entering Construction Phase





Rail Baltica

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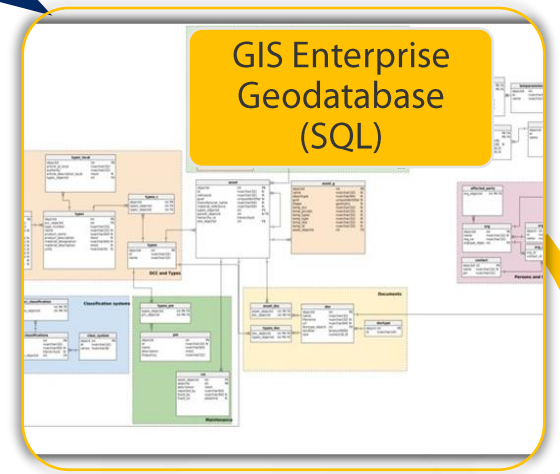
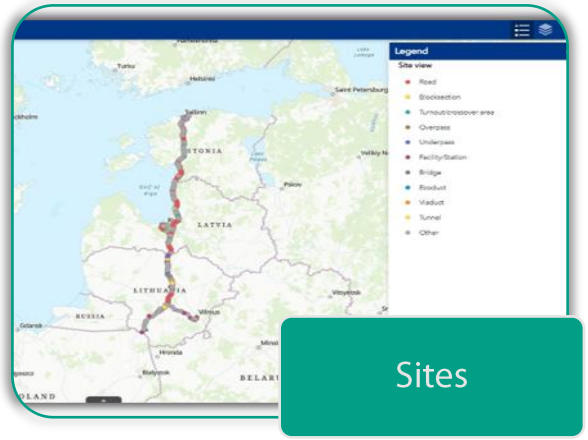
GIS and AIM
Pärnu reisiterminali ideelahendus: AB PLUSS OÜ

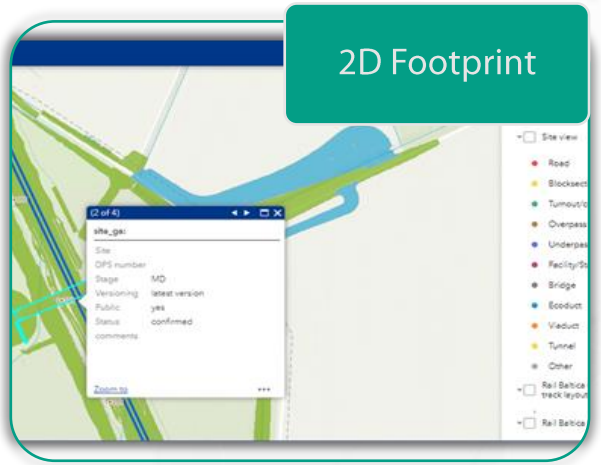
BIM to GIS (Asset Register)

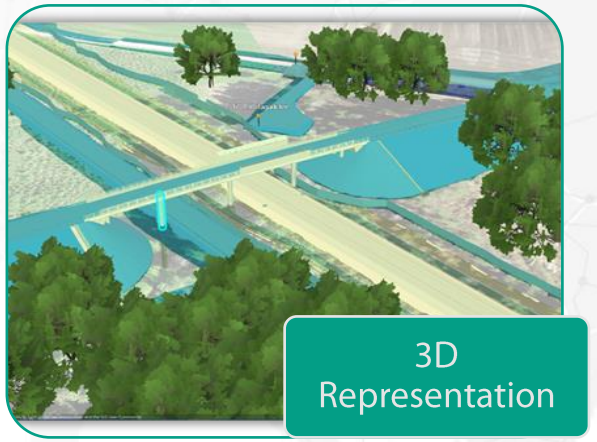


Web Interface

BIM is one of the main source of data for Asset Register.
After completing the import processes, BIM data is linked to other data and becomes an integral part of the overall GIS system.







Rail Baltica
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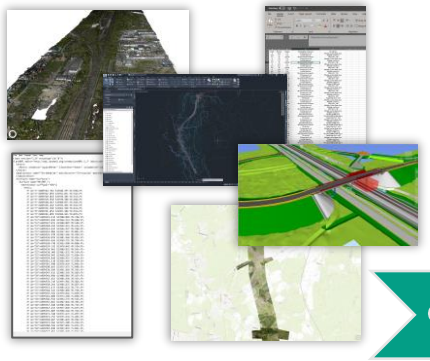
Data Workflows

Design Data



National/Worldwide Databases Open Data Portals

MAA-AMET

Eesti avaandmed

geoportal.lt

GEO Latvija.lv

INSPIRE GEOPORTAL
Enhancing access to European spatial data
European Commission > INSPIRE > Geoportal

Collecting

Organizing

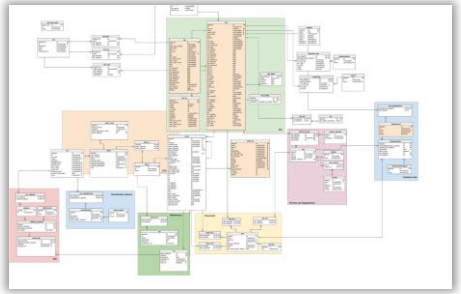
Processing

Integrating

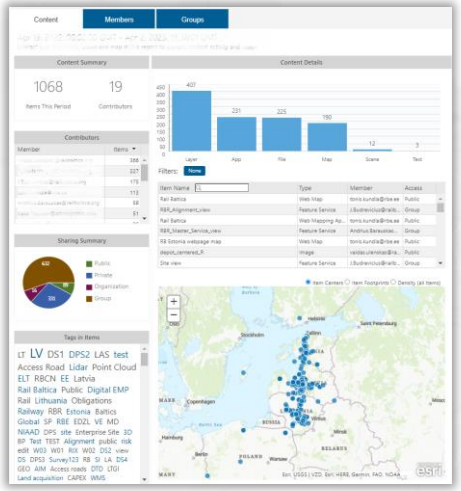
ArcGIS Enterprise

ArcGIS Data Store

GIS Enterprise Geodatabase (SQL) / Asset Register



ArcGIS Enterprise Portal



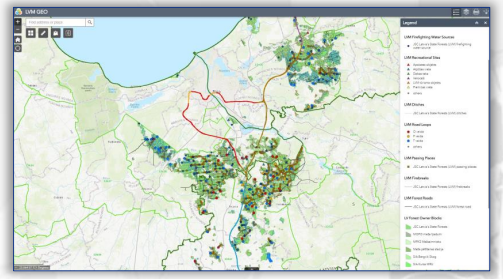
2D maps

3D Maps

Dashboards

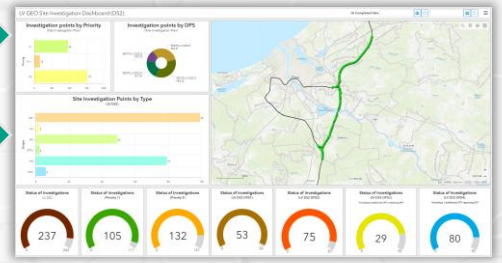
Public Data

2D maps

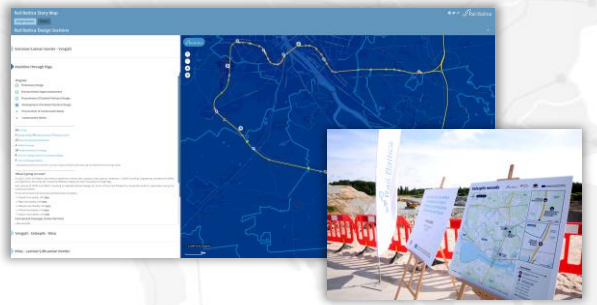


3D maps

Dashboards



Public data



Rail Baltica

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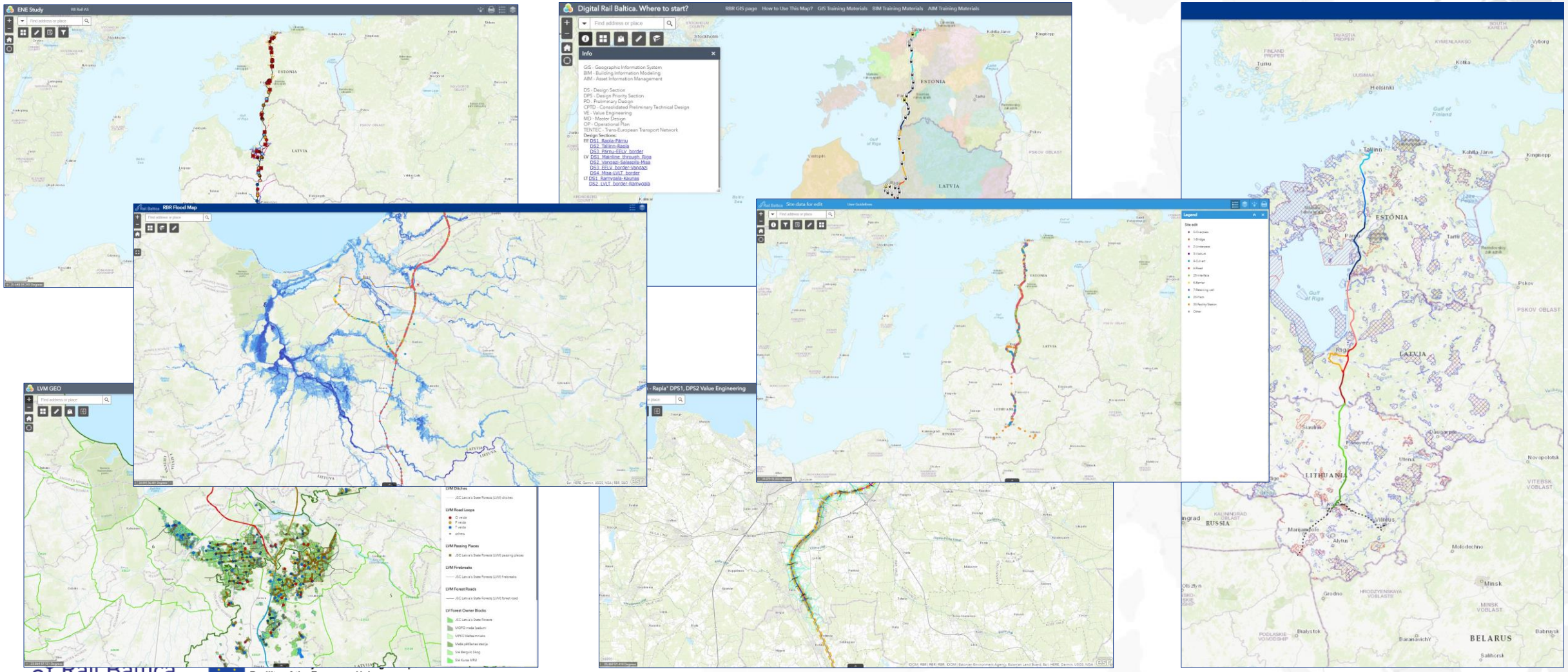
GIS Web maps

All key information in one place

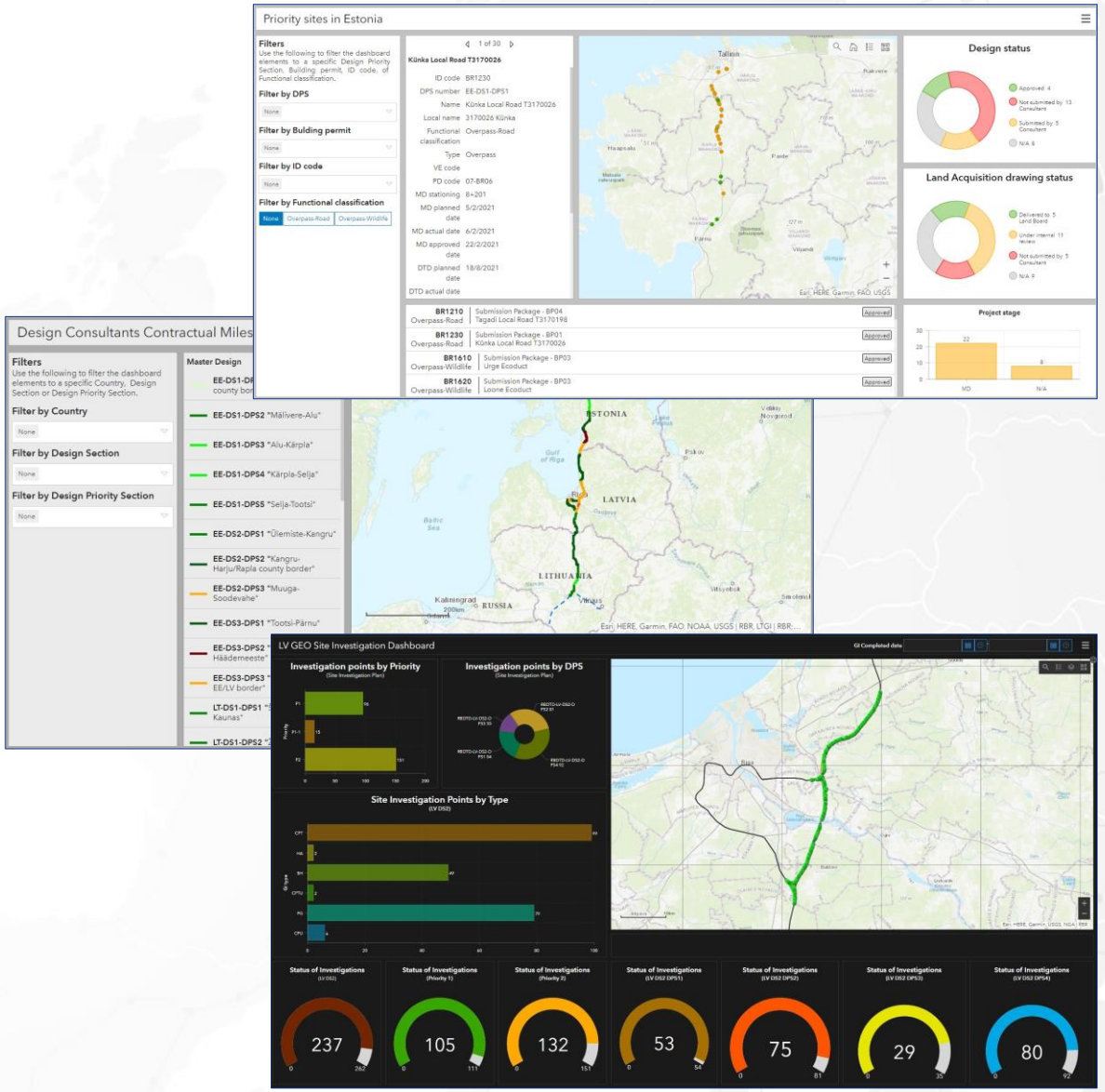


Monitoring and Reporting in GIS

Dashboards that provide key information and are available to all parties at any time and in any place

Less time spent updating PowerPoint presentations and Excel spreadsheets

Ongoing integration with ArcGIS and Oracle Primavera P6 will ensure rapid transmission of information without additional human intervention (machine to machine communication)



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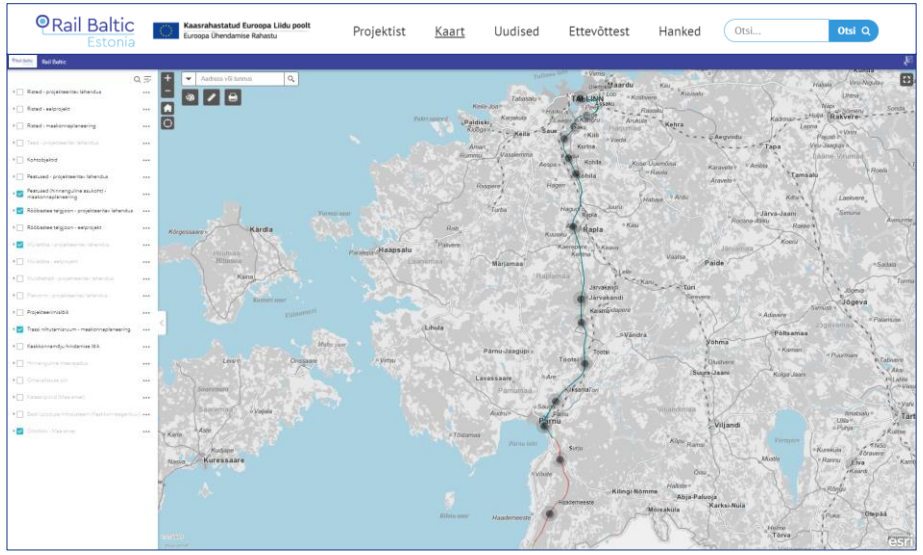
Global Project Partners Engagement

RB Rail AS & Rail Baltic Estonia OÜ

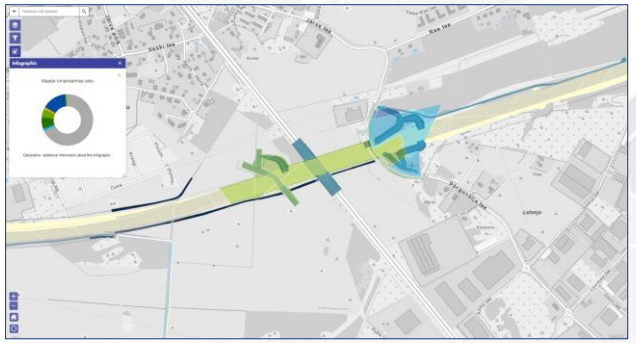
Sharing common environment and data creates new cooperation opportunities between project coordinators and implementing bodies

https://rbestonia.ee/

Public Map



Land Acquisition



3D

BIM + GIS data

Rail Baltic Estonia OÜ

Tõnis Kundla

GIS Specialist

E-mail: tonis.kundla@rbe.ee

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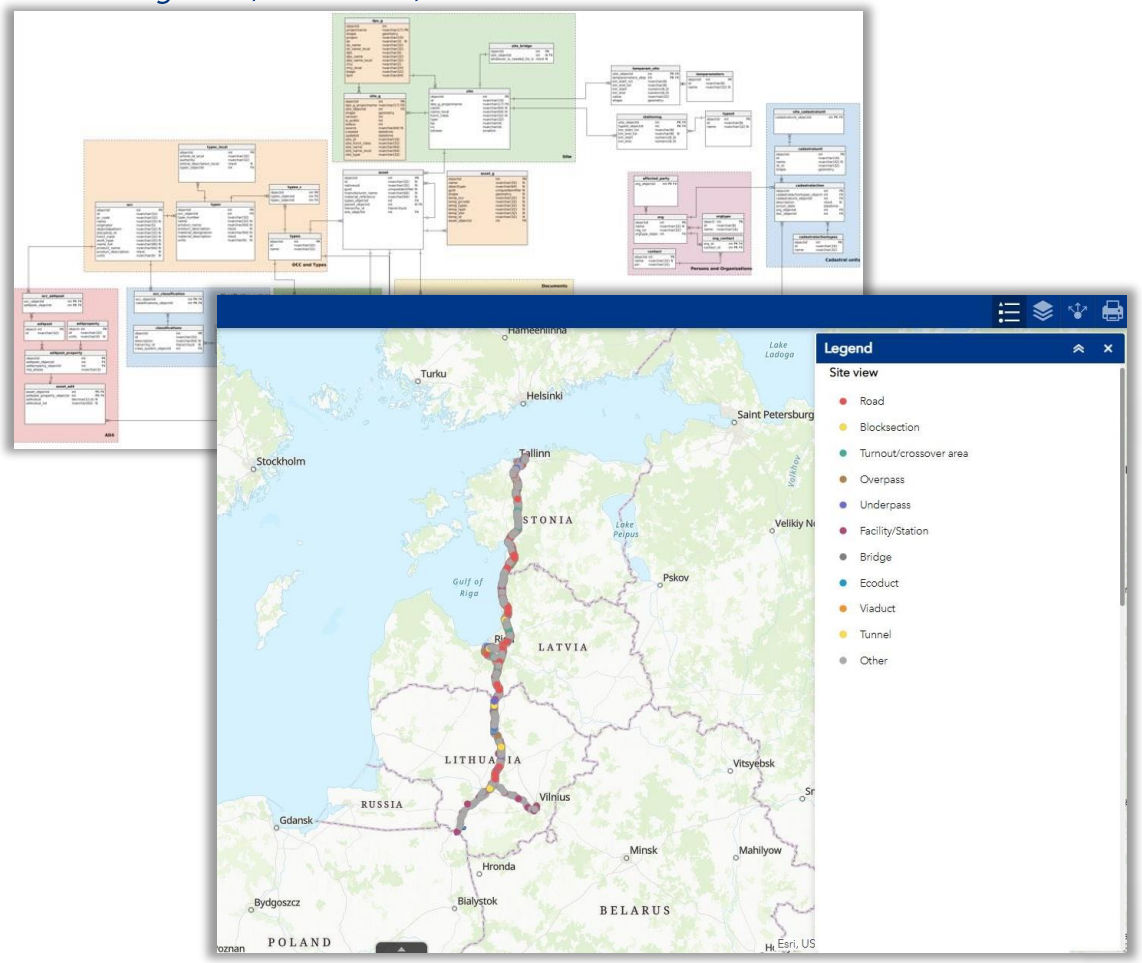
Data Management Challenges

Asset Register

Data Integration, Verification, Unification

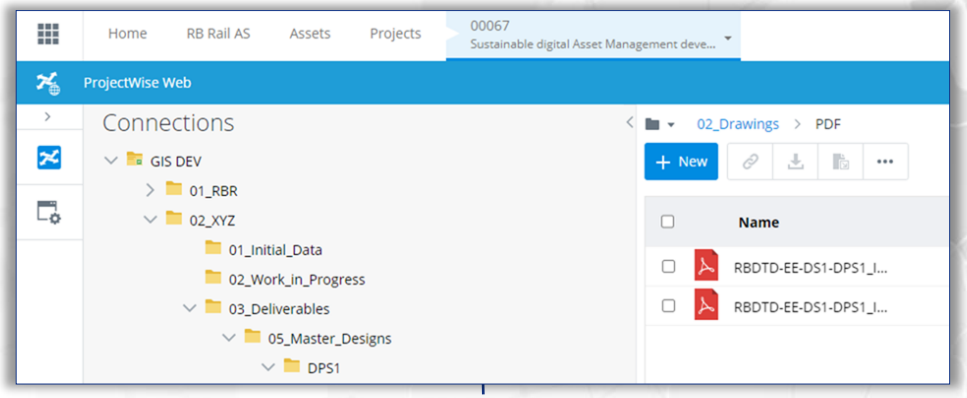


Ensure that the same language is spoken at all levels of the project

CDE integration

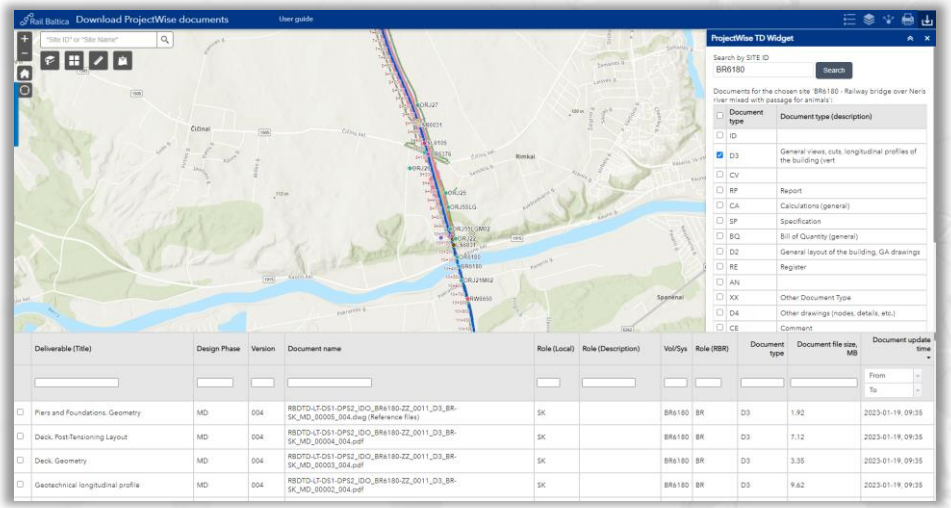
Ensure communication between CDEs

ProjectWise



API

Accessing information in ArcGIS Web App



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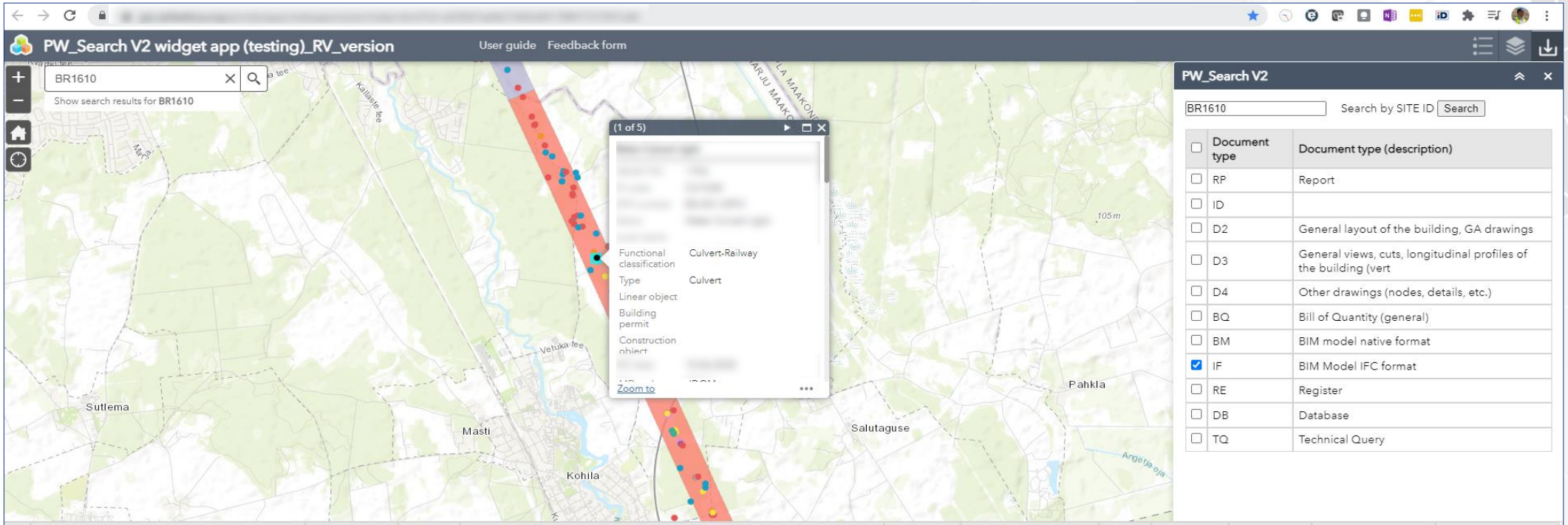
CDE integration example: ArcGIS Online - PW

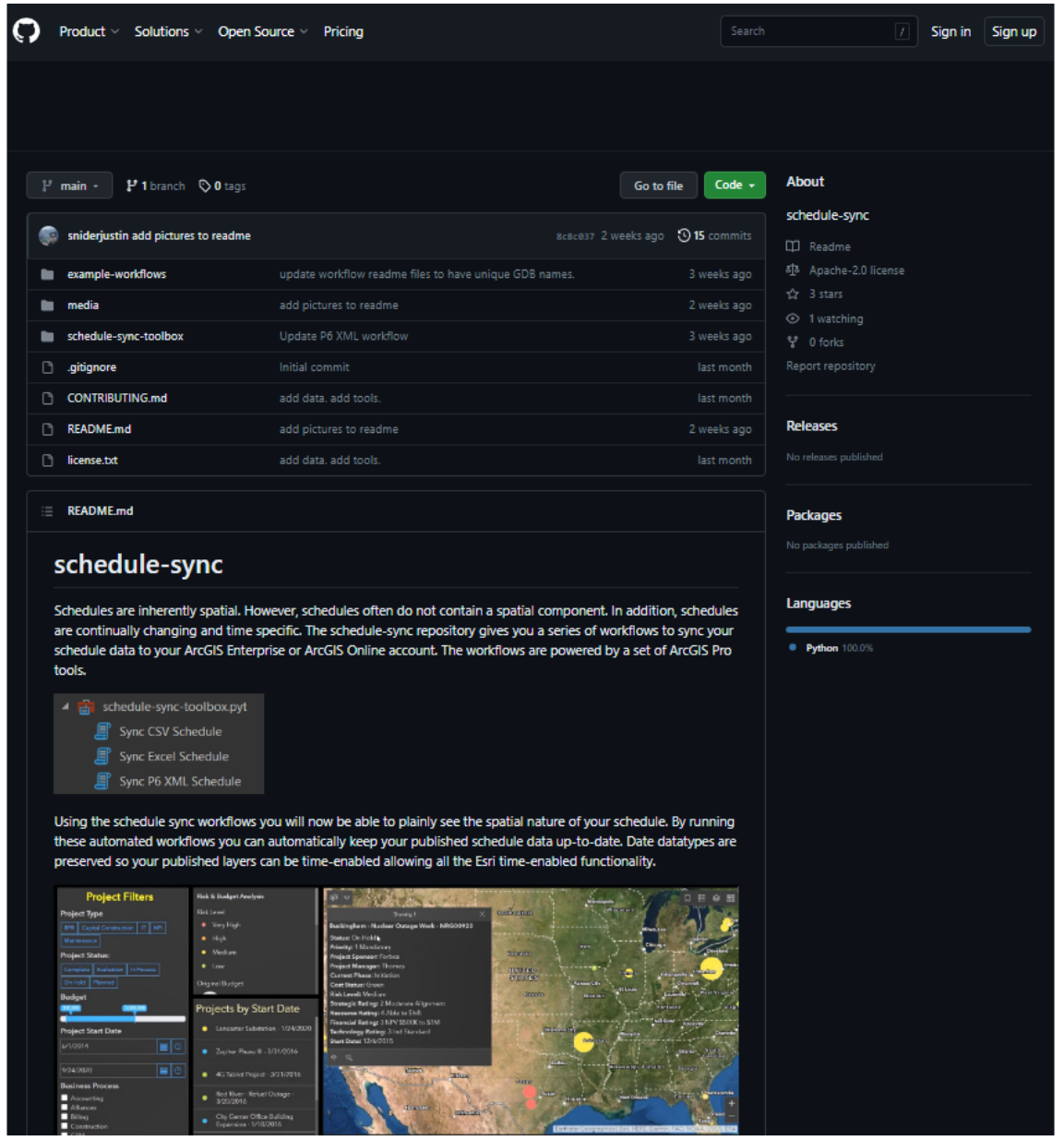


Deliverable (Title)	Design Phase	Version	Document name	Role (Local)	Role (Description)	Vol/Sys	Role (RBR)	Document type	Document file size, MB	Document update time
										From / To
Model (Fillings)	MD	003		AA	General part	BR1610	EW	IF	43.48	2020-11-12 16:56
Boreholes Model	VE	001		AA	General part	BR1610	GEO	IF	0.1	2020-11-12 16:56
Fence Model	MD	001		TS	Bridges, viaducts, estacade and tunnels	BR1610	BR	BM	17.86	2020-11-12 16:56
Model (Excavations)	MD	003		AA	General part	BR1610	EW	IF	6.61	2020-11-12 16:56
Boreholes Model	VE	001		AA	General part	BR1610	GEO	BM	1.47	2020-11-12 17:20

ArcGIS and P6 integration

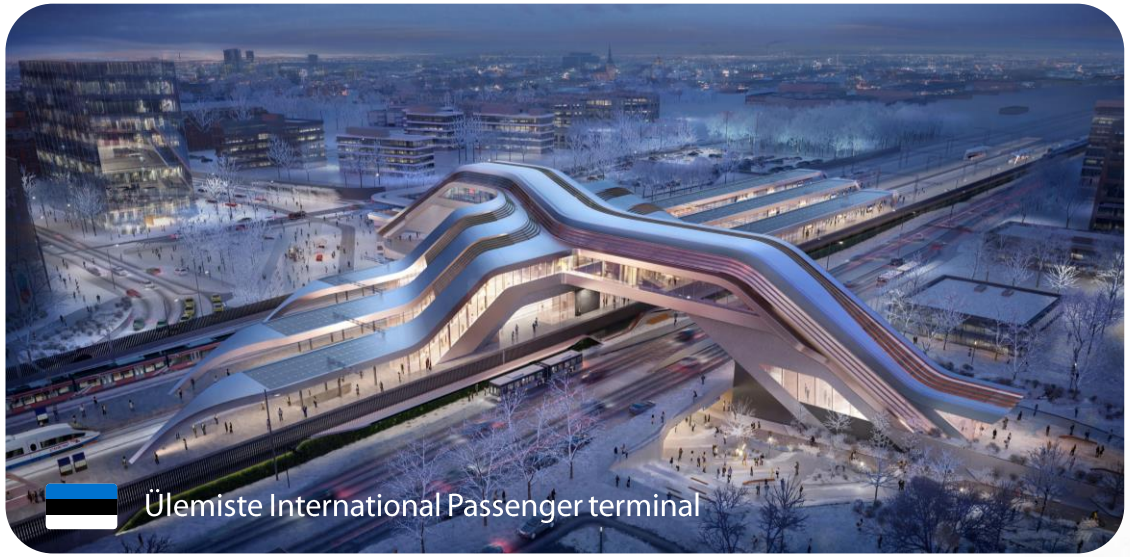
Couple of weeks ago ESRI published the code for the ArcGIS and P6 integration tool – now our job: To understand and make it work! ☺

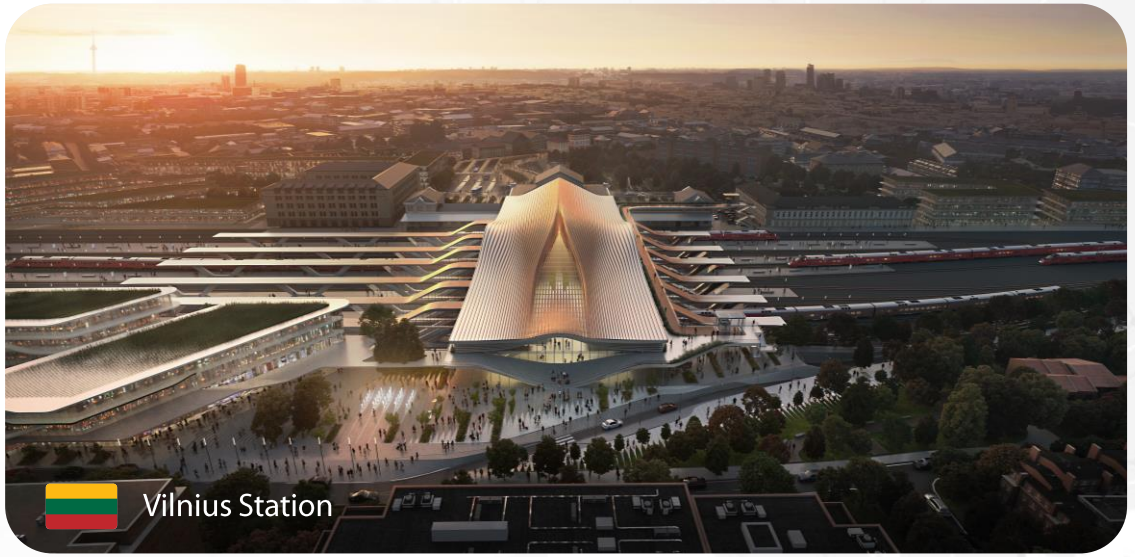
https://github.com/Esri/schedule-sync



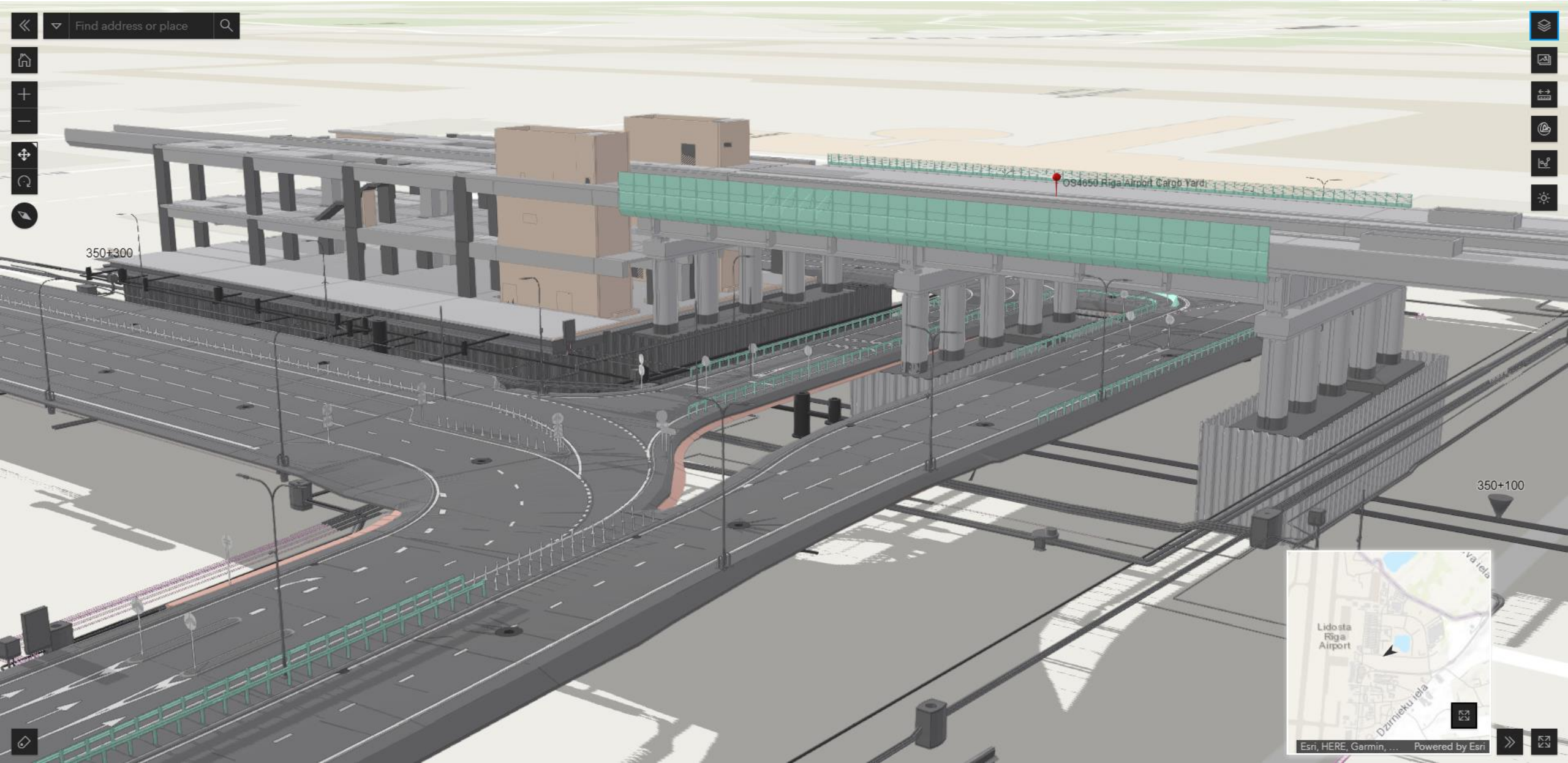

Rīga Central Station

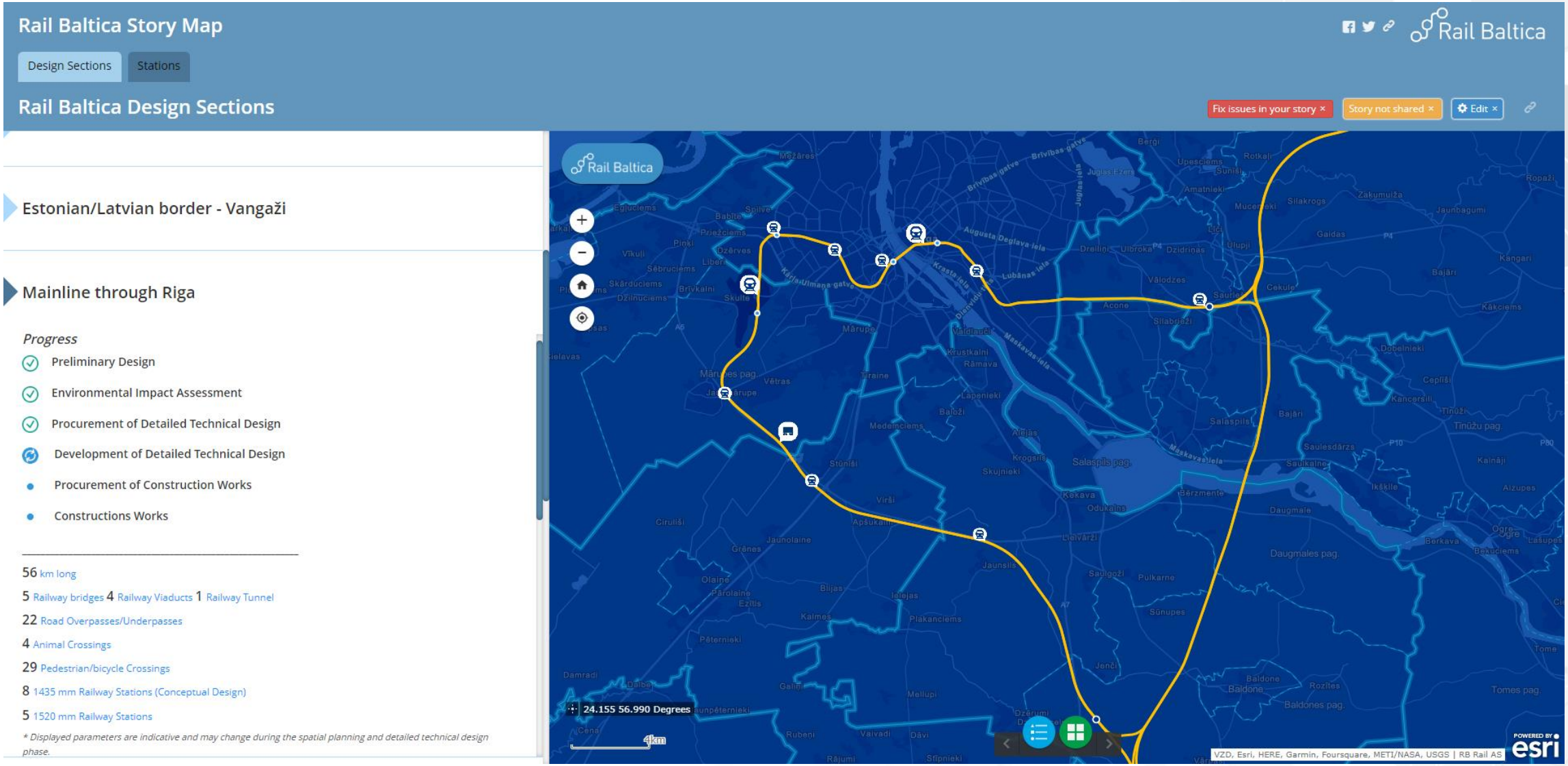

RIX Airport Station


Ülemiste International Passenger terminal


Vilnius Station

RIX stacija un Rail Baltica Latvijā

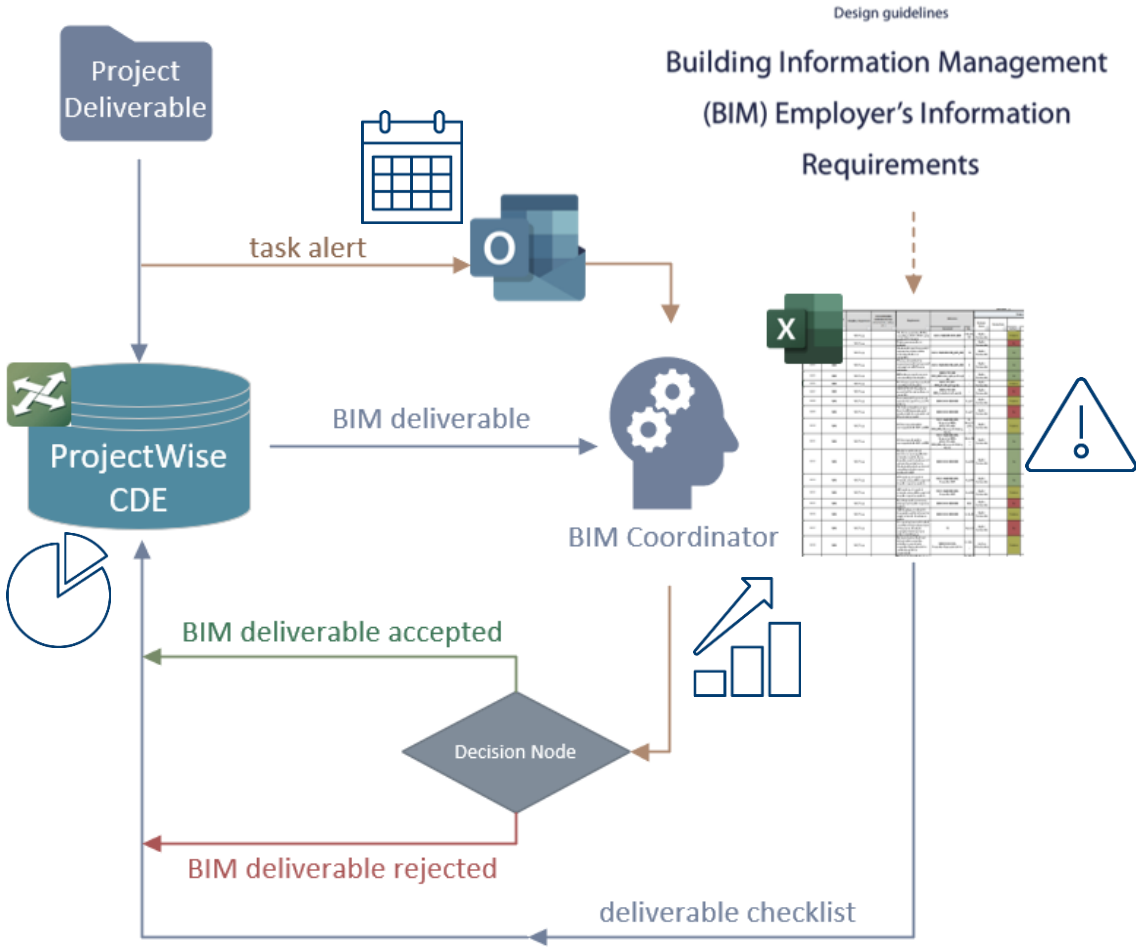




https://info.railbaltica.org/en/interactive-map


Procesu automatizācija
Pärnu reisiterminali ideelahendus: AB PLUSS OÜ

BIM Review process and spots for automation



- ✓ Can we get clear picture on upcoming and pending BIM tasks (all PW projects together) ?
- ✓ Can we get BIM team work performance analytics?
- ✓ Can we use BIM data to answer Checklist questions?
- ✓ Can we get BIM issues analytics based on Checklist statuses?

Citizen Developer Approach

A **citizen developer** is an employee who creates application capabilities for consumption by themselves or others, using tools that are not actively forbidden by IT or business units. A citizen developer is a persona, not a title or targeted role.

Gartner

A **citizen developer** is a user with little to no coding experience who builds applications using IT-approved technology and processes

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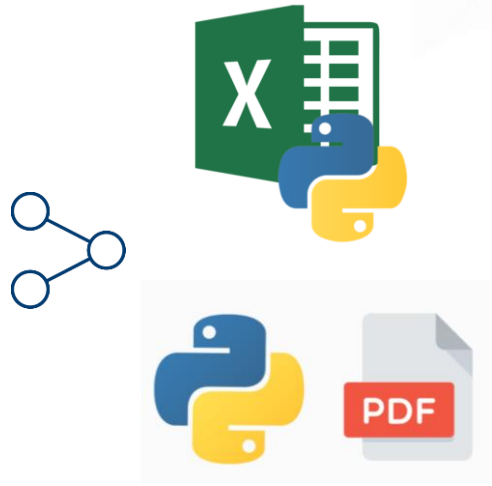
pandas

NumPy



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WinPython

QEXvsDD.ipynb

Code

```
[1]: import pandas as pd
     import os

     dDrop_excel = 'dd.xlsx'
     all_qex_xls = []
     path = os.getcwd()
     files = os.listdir(path)
     for i in files:
         if i.startswith("qex"):
             all_qex_xls.append(i)
     print(all_qex_xls)

     dfs = []
     for file in all_qex_xls:
         dfs.append(pd.read_excel(file))
     merged_qexs = pd.concat(dfs)
     header_qex = merged_qexs.iloc[11]
     qex_df1 = pd.DataFrame(merged_qexs.values[1:],columns=header_qex)
     qex_cleaned = qex_df1[["Object ID","Qty","Unit","VolSysZone"]]
     qex_cleaned.rename(columns={'Object ID':'RBR-Object_ID'},inplace=True)
     qex_cleaned.rename(columns={'VolSysZone':'RBR-Vol_sys_zone'},inplace=True)
     qex = qex_cleaned.fillna(0)
     qex.drop(qex.loc[qex["RBR-Object_ID"]==0].index, inplace=True)
     qex.drop(qex.loc[qex["Qty"]==0].index, inplace=True)

     qex.to_excel("takealook.xlsx")
```

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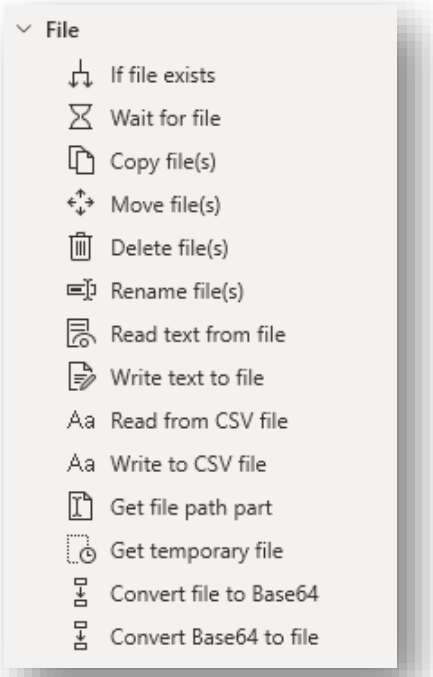

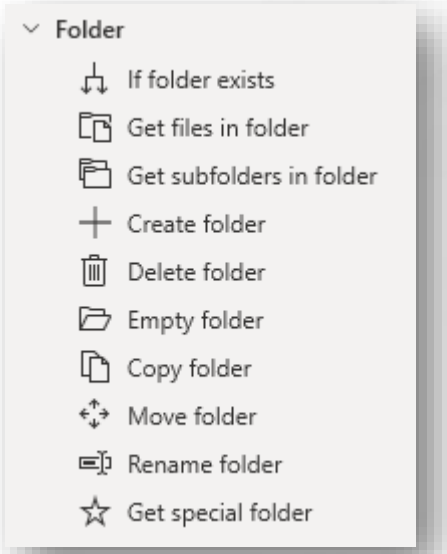

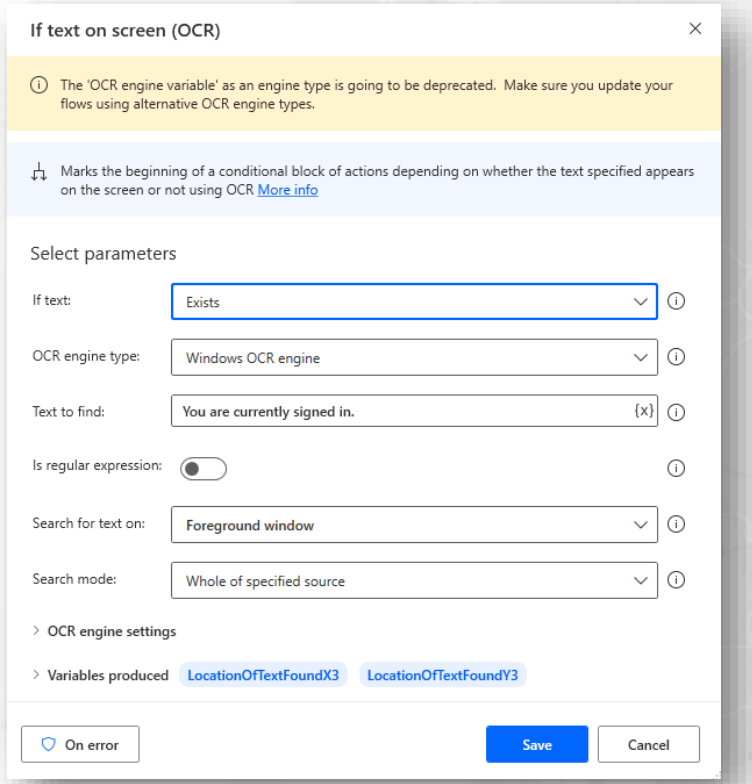

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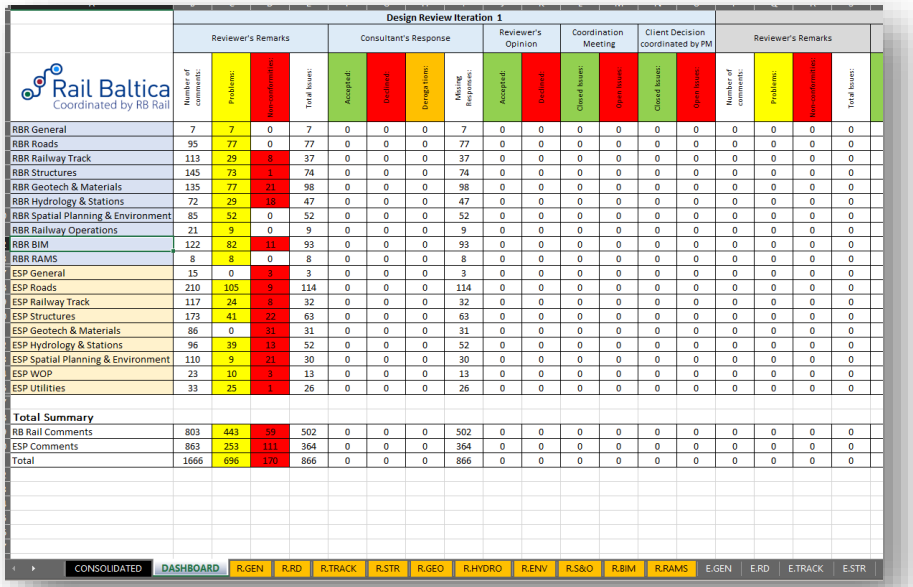
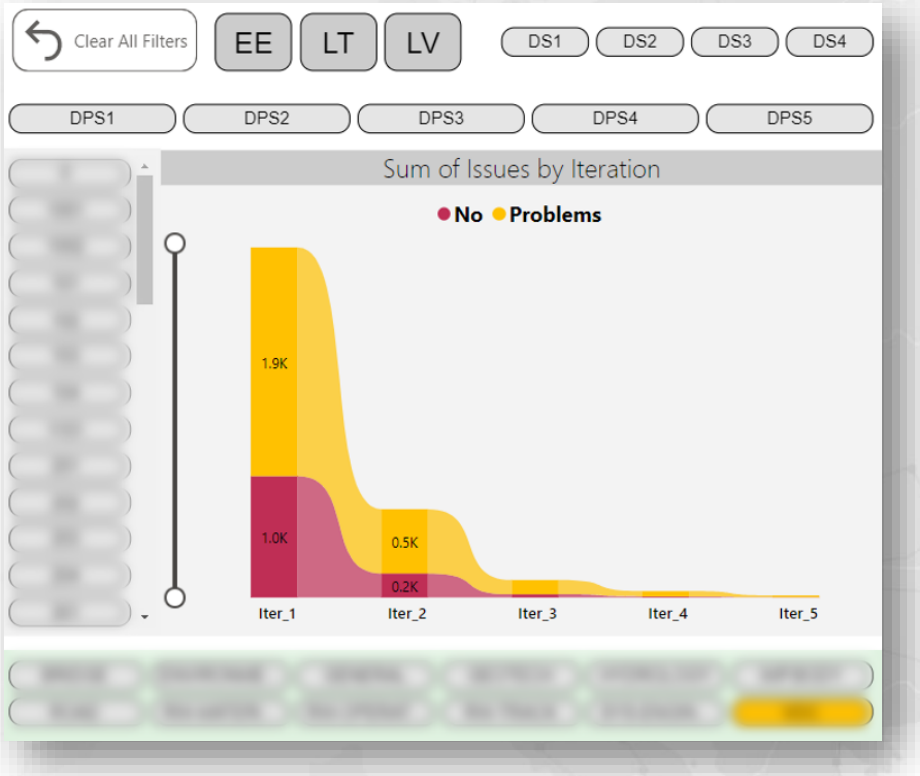


Rail Baltica Coordinated by RB Rail	Design Review Iteration 1																	
	Reviewer's Remarks				Consultant's Response				Reviewer's Opinion		Coordination Meeting		Client Decision coordinated by PM		Reviewer's Remarks			
	Number of comments:	Problems:	Non-conformities:	Total issues:	Accepted:	Declined:	Derogations:	Missing Responses:	Accepted:	Declined:	Closed issues:	Open issues:	Closed issues:	Open issues:	Number of comments:	Problems:	Non-conformities:	Total issues:
RBR General	7	7	0	7	0	0	0	7	0	0	0	0	0	0	0	0	0	0
RBR Roads	95	77	0	77	0	0	0	77	0	0	0	0	0	0	0	0	0	0
RBR Railway Track	113	29	8	37	0	0	0	37	0	0	0	0	0	0	0	0	0	0
RBR Structures	145	73	1	74	0	0	0	74	0	0	0	0	0	0	0	0	0	0
RBR Geotech & Materials	135	77	21	98	0	0	0	98	0	0	0	0	0	0	0	0	0	0
RBR Hydrology & Stations	72	29	18	47	0	0	0	47	0	0	0	0	0	0	0	0	0	0
RBR Spatial Planning & Environment	85	52	0	52	0	0	0	52	0	0	0	0	0	0	0	0	0	0
RBR Railway Operations	21	9	0	9	0	0	0	9	0	0	0	0	0	0	0	0	0	0
RBR BIM	122	82	11	93	0	0	0	93	0	0	0	0	0	0	0	0	0	0
RBR RAMS	8	8	0	8	0	0	0	8	0	0	0	0	0	0	0	0	0	0
ESP General	15	0	3	3	0	0	0	3	0	0	0	0	0	0	0	0	0	0
ESP Roads	210	105	9	114	0	0	0	114	0	0	0	0	0	0	0	0	0	0
ESP Railway Track	117	24	8	32	0	0	0	32	0	0	0	0	0	0	0	0	0	0
ESP Structures	173	41	22	63	0	0	0	63	0	0	0	0	0	0	0	0	0	0
ESP Geotech & Materials	86	0	31	31	0	0	0	31	0	0	0	0	0	0	0	0	0	0
ESP Hydrology & Stations	96	39	13	52	0	0	0	52	0	0	0	0	0	0	0	0	0	0
ESP Spatial Planning & Environment	110	9	21	30	0	0	0	30	0	0	0	0	0	0	0	0	0	0
ESP WOP	23	10	3	13	0	0	0	13	0	0	0	0	0	0	0	0	0	0
ESP Utilities	33	25	1	26	0	0	0	26	0	0	0	0	0	0	0	0	0	0
Total Summary																		
RB Rail Comments	803	443	59	502	0	0	0	502	0	0	0	0	0	0	0	0	0	0
ESP Comments	863	253	111	364	0	0	0	364	0	0	0	0	0	0	0	0	0	0
Total	1666	696	170	866	0	0	0	866	0	0	0	0	0	0	0	0	0	0

CONSOLIDATED | DASHBOARD | R.GEN | R.RD | R.TRACK | R.STR | R.GEO | R.HYDRO | R.ENV | R.S&O | R.BIM | R.RAMS | E.GEN | E.RD | E.TRACK | E.STR



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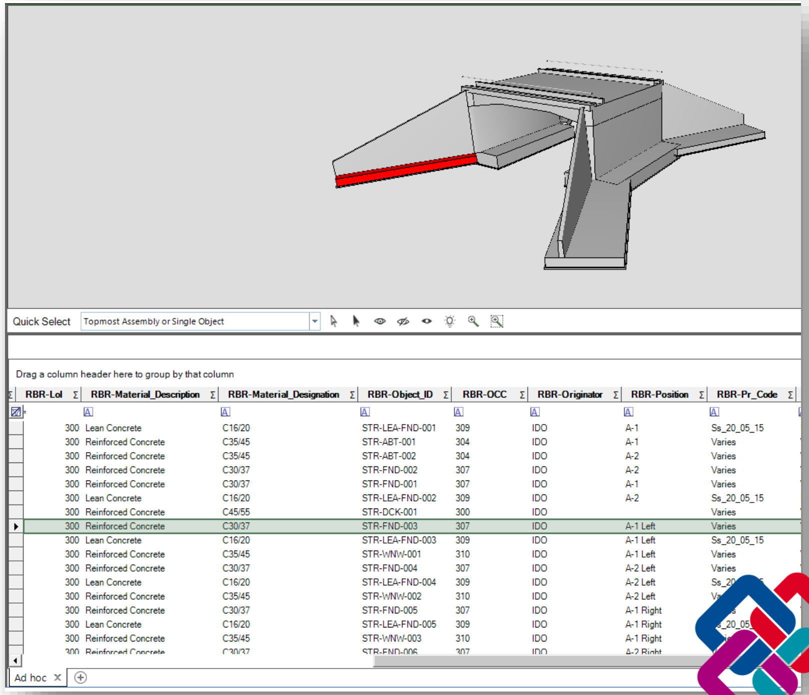
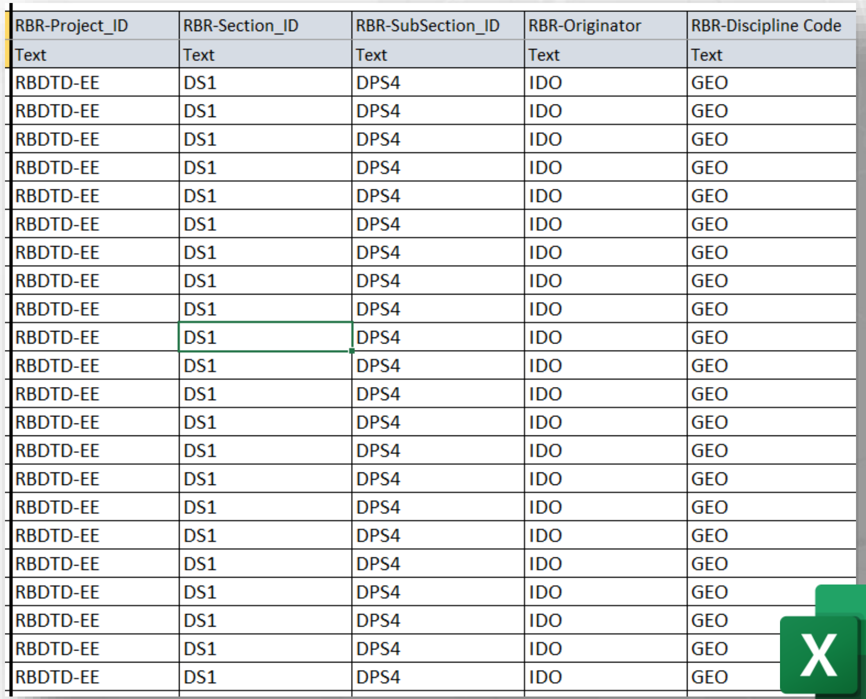
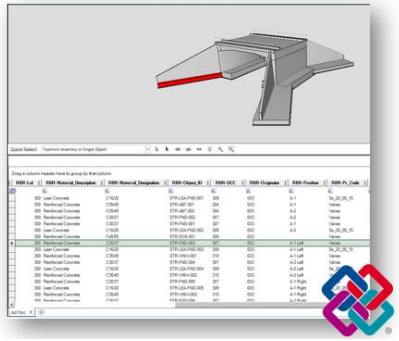


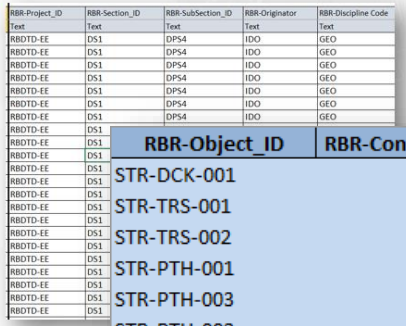
RBR-LoI	RBR-Material_Description	RBR-Material_Designation	RBR-Object_ID	RBR-OCC	RBR-Originator	RBR-Position	RBR-Pr_Code
300	Lean Concrete	C16/20	STR-LEA-FND-001	309	IDO	A-1	Ss_20_05_15
300	Reinforced Concrete	C35/45	STR-ABT-001	304	IDO	A-1	Varies
300	Reinforced Concrete	C35/45	STR-ABT-002	304	IDO	A-2	Varies
300	Reinforced Concrete	C30/37	STR-FND-002	307	IDO	A-2	Varies
300	Reinforced Concrete	C30/37	STR-FND-001	307	IDO	A-1	Varies
300	Lean Concrete	C16/20	STR-LEA-FND-002	309	IDO	A-2	Ss_20_05_15
300	Reinforced Concrete	C45/55	STR-DCK-001	300	IDO		Varies
300	Reinforced Concrete	C30/37	STR-FND-003	307	IDO	A-1 Left	Varies
300	Lean Concrete	C16/20	STR-LEA-FND-003	309	IDO	A-1 Left	Ss_20_05_15
300	Reinforced Concrete	C35/45	STR-WNW-001	310	IDO	A-1 Left	Varies
300	Reinforced Concrete	C30/37	STR-FND-004	307	IDO	A-2 Left	Varies
300	Lean Concrete	C16/20	STR-LEA-FND-004	309	IDO	A-2 Left	[illegible]
300	Reinforced Concrete	C35/45	STR-WNW-002	310	IDO	A-2 Left	[illegible]
300	Reinforced Concrete	C30/37	STR-FND-005	307	IDO	A-1 Right	[illegible]
300	Lean Concrete	C16/20	STR-LEA-FND-005	309	IDO	A-1 Right	[illegible]
300	Reinforced Concrete	C35/45	STR-WNW-003	310	IDO	A-1 Right	[illegible]
300	Reinforced Concrete	C30/37	STR-FND-006	307	IDO	A-2 Right	[illegible]

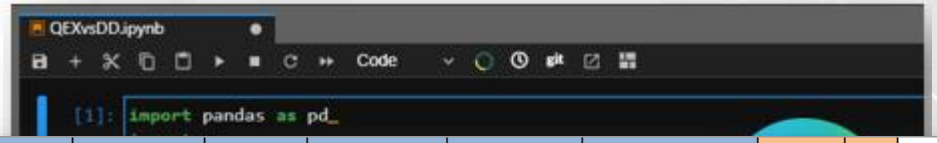


RBR-Project_ID	RBR-Section_ID	RBR-SubSection_ID	RBR-Originator	RBR-Discipline Code
Text	Text	Text	Text	Text
RBDTD-EE	DS1	DPS4	IDO	GEO
RBDTD-EE	DS1	DPS4	IDO	GEO
RBDTD-EE	DS1	DPS4	IDO	GEO
RBDTD-EE	DS1	DPS4	IDO	GEO
RBDTD-EE	DS1	DPS4	IDO	GEO
RBDTD-EE	DS1	DPS4	IDO	GEO
RBDTD-EE	DS1	DPS4	IDO	GEO
RBDTD-EE	DS1	DPS4	IDO	GEO
RBDTD-EE	DS1	DPS4	IDO	GEO
RBDTD-EE	DS1	DPS4	IDO	GEO
RBDTD-EE	DS1	DPS4	IDO	GEO
RBDTD-EE	DS1	DPS4	IDO	GEO
RBDTD-EE	DS1	DPS4	IDO	GEO
RBDTD-EE	DS1	DPS4	IDO	GEO
RBDTD-EE	DS1	DPS4	IDO	GEO
RBDTD-EE	DS1	DPS4	IDO	GEO
RBDTD-EE	DS1	DPS4	IDO	GEO
RBDTD-EE	DS1	DPS4	IDO	GEO
RBDTD-EE	DS1	DPS4	IDO	GEO
RBDTD-EE	DS1	DPS4	IDO	GEO
RBDTD-EE	DS1	DPS4	IDO	GEO
RBDTD-EE	DS1	DPS4	IDO	GEO

Use Case: QEX and IFC data comparison







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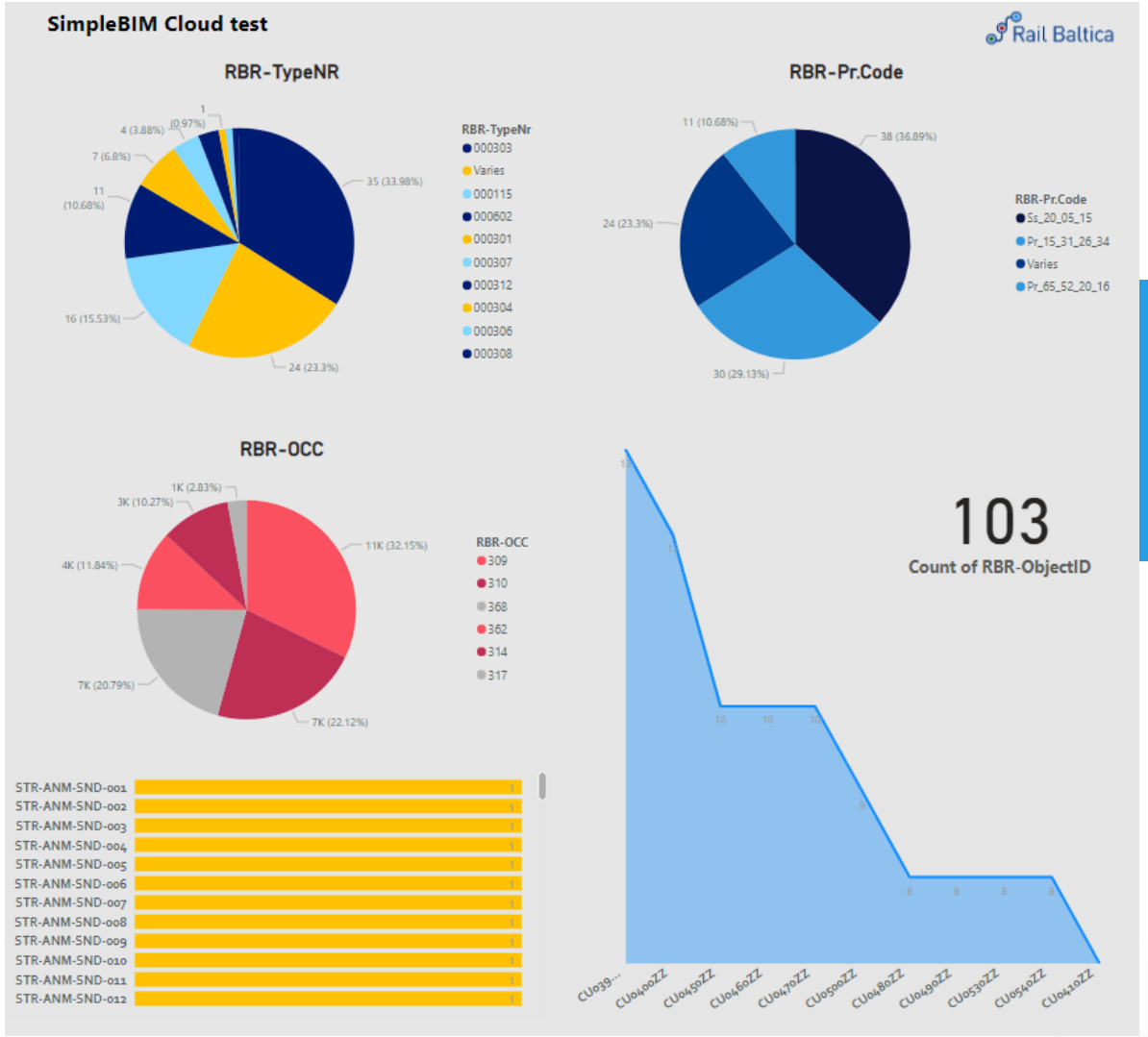
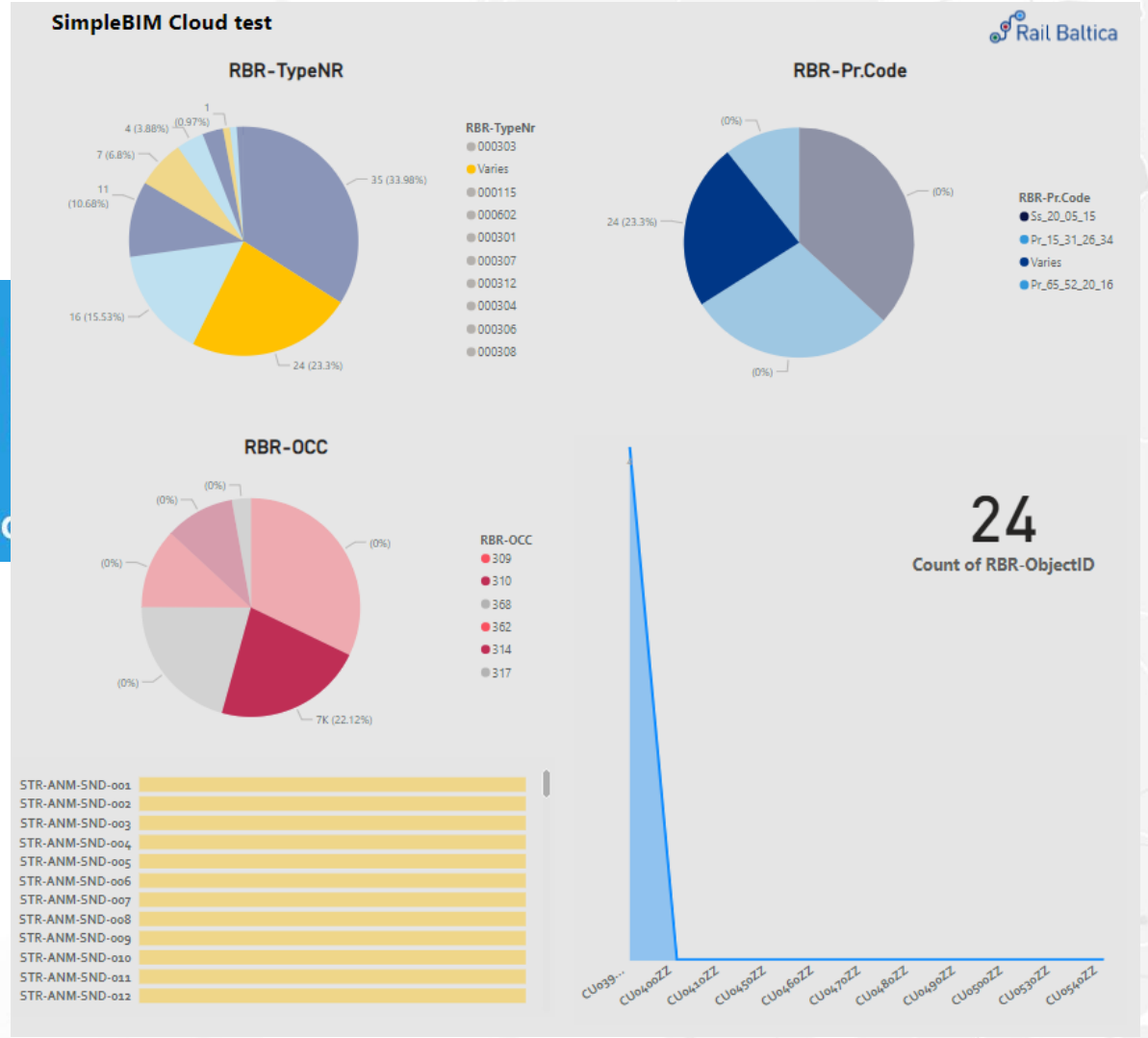
RBR-Object_ID	RBR-Concrete_Volume	RBR-Length	RBR-Steel_Mass	RBR-Volume	RBR-Area	RBR-Quantity	RBR-Number	RBR-Vol sys zone	Qty	Unit	Ok/Not
STR-DCK-001	2852.96	131.00 m	460934.18	Not in DD	Not in DD	0	0	BR0350ZZ	2852.96	m3	TRUE
STR-TRS-001	33.31	0	4587.91	Not in DD	Not in DD	0	0	BR0350ZZ	33.31	m3	TRUE
STR-TRS-002	33.55	0	4587.91	Not in DD	Not in DD	0	0	BR0350ZZ	33.55	m3	TRUE
STR-PTH-001	24.15	132.05 m	1252.92	Not in DD	Not in DD	0	0	BR0350ZZ	24.15	m3	TRUE
STR-PTH-003	24.14	132.05 m	1253.03	Not in DD	Not in DD	0	0	BR0350ZZ	24.14	m3	TRUE
STR-PTH-002	6.96	144.90 m	1666.41	Not in DD	Not in DD	0	0	BR0350ZZ	6.96	m3	TRUE
STR-PTH-004	6.92	144.15 m	1657.76	Not in DD	Not in DD	0	0	BR0350ZZ	6.92	m3	TRUE
STR-LEA-FND-022	12.52	0	0	Not in DD	Not in DD	0	0	BR0350ZZ	12.52	m3	TRUE
STR-LEA-FND-021	5.7	0	0	Not in DD	Not in DD	0	0	BR0350ZZ	5.7	m3	TRUE
STR-FND-018	189	0	14116.39	Not in DD	Not in DD	0	0	BR0350ZZ	189	m3	TRUE
STR-PIL-026	28.84	25.50 m	2131.57	Not in DD	Not in DD	0	1	BR0350ZZ	1	pc	TRUE
STR-PIL-027	28.84	25.50 m	2131.57	Not in DD	Not in DD	0	1	BR0350ZZ	1	pc	TRUE
STR-PIL-028	28.84	25.50 m	2131.57	Not in DD	Not in DD	0	1	BR0350ZZ	1	pc	TRUE
STR-PIL-029	28.84	25.50 m	2131.57	Not in DD	Not in DD	0	1	BR0350ZZ	1	pc	TRUE
STR-PIL-030	28.84	25.50 m	2131.57	Not in DD	Not in DD	0	1	BR0350ZZ	1	pc	TRUE
STR-RTW-005	41.65	0	4065.58	Not in DD	Not in DD	0	0	BR0350ZZ	41.65	m3	TRUE
DR-PIPE-STEEL-001	0	0	0	Not in DD	Not in DD	1	0	BR0350ZZ	0	0	FALSE
DR-PIPE-STEEL-002	0	0	0	Not in DD	Not in DD	1	0	BR0350ZZ	0	0	FALSE
DR-PIPE-STEEL-003	0	0	0	Not in DD	Not in DD	1	0	BR0350ZZ	0	0	FALSE
DR-PIPE-STEEL-004	0	0	0	Not in DD	Not in DD	1	0	BR0350ZZ	0	0	FALSE
DR-PIPE-STEEL-005	0	0	0	Not in DD	Not in DD	1	0	BR0350ZZ	0	0	FALSE
DR-PIPE-STEEL-006	0	0	0	Not in DD	Not in DD	1	0	BR0350ZZ	0	0	FALSE
DR-PIPE-STEEL-007	0	0	0	Not in DD	Not in DD	1	0	BR0350ZZ	0	0	FALSE
DR-PIPE-STEEL-008	0	0	0	Not in DD	Not in DD	1	0	BR0350ZZ	0	0	FALSE

Spec Code	RBR-OCC	QUANTITIES		
		UNICLASS 2015 Product Code(Pr_Code)	Type number	Product Description
	N/A	Pr_35_31_68		Waterproofing on rail structures decks consists of all works and expense necessary to achieve the specified end result, e.g. workforce, materials, equipment and transportation (incl. fuel, insurance, etc.). This item is meant for waterproofing systems applicable to bridges, viaducts and underpass structures on whose deck the ballast of the railway tracks is directly supported or has earth filling on top. In these structures, each system will consist of a membrane, formed by one or more layers of hea welded elastomer bitumen sheets, adhered to the deck, on which a protection will be placed. This protection will be measured separately. Including sealing with epoxy at the edges of the membrane in the deck.
			000302	
	N/A	Pr_35_31_68		Waterproofing asphalt protection course consists of all works and expenses necessary to achieve the specified end result, e.g. workforce, materials, equipment and transportation (incl. fuel, insurance, etc.). This item is meant for supply and placement of a 3.00 cm thick asphalt layer protect the waterproofing system. It includes all the materials and work necessary for its completion
			000308	

On-going Projects: SimpleBIM Cloud





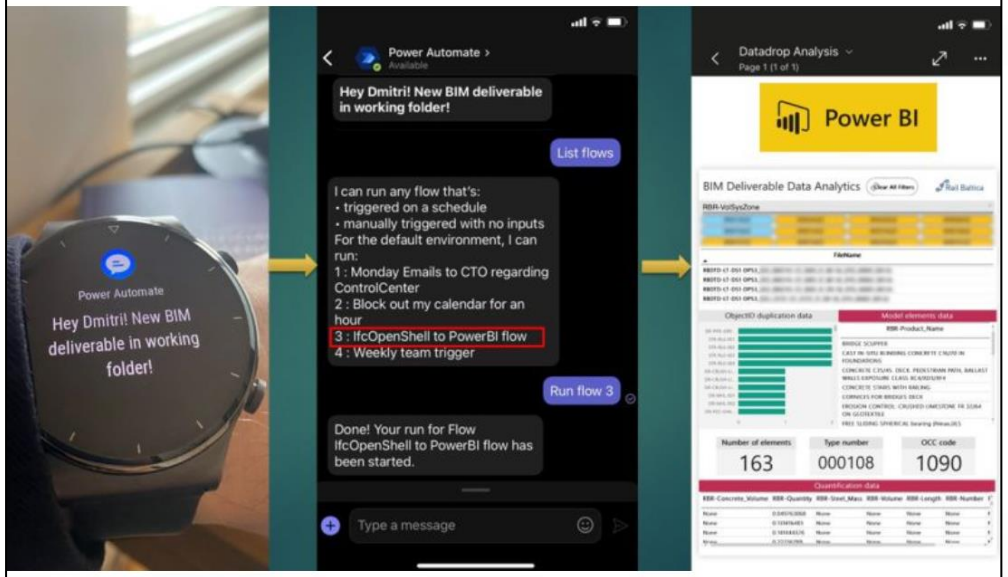
Automation possibilities

Dmitri Garbuzenko • 1st
BIM and AIM Coordinator at RB Rail AS | Rail Baltica
2w •

What if you could analyze your BIM deliverables without even opening your laptop? With Power Automate, Teams, Python (ifcOpenShell + Pandas), and PowerBI, you can create a rapid flow to see BIM data and assess model quality—all from your PHONE.

With just a few taps, you'll gain valuable insights that can help you make better, actually data-driven decisions and optimize your workflows before you go to good-old "model rotation".

#bim #python #pandas #data #buildinginformationmodeling #powerautomate #micorsoft #datanalytics #dataanalysis #rpa #powerbi



You and 104 others

5 comments • 3 reposts

Dmitri Garbuzenko • 1st
BIM and AIM Coordinator at RB Rail AS | Rail Baltica
3d •

Thanks to chatGPT we can now make things that were too hard for BIM coordinators with no previous programming experience . I was struggling with IfcOpenShell more than a year to get IFC data to Pandas Dataframe.
But now, after 30-40 prompts in chatGPT - problem solved. Skript ready without any procurement of any new software(!)
By dragging to PowerBI all needed sources: IFC data (Dataframe to csv) and all other EIR specified tables (OCC codes table, PrCode table, PayItem tables, QEXvsModelData table, etc) and creating connections between them - any BIM coordinator can get much better understanding what is hidden under geometry and finally focus on that "I" letter in BIM. Finally
#bim #powerbi #data #pandas #chatgpt #bimcoordination

Artis Kurps and 123 others

1 comment • 2 reposts

EIROPAS DZELZCEĻA LĪNIJAS

Darbs projektos un jaunie speciālisti

RIX Airport Station

Positive and negative aspects of project work

Positive

- ✓ Internal motivation
- ✓ Source of commitment
- ✓ Providing sense of purpose
- ✓ Adventure
- ✓ Learning possibilities
- ✓ Variety of roles
- ✓ Freedom and empowerment

Challenges

- ✓ High goal orientation
- ✓ Uncertainty/novel
- ✓ Outside comfort zone
- ✓ Multi role assignement
- ✓ Higher degree of responsibility

Negative

- ✓ Over commitment
- ✓ Stress
- ✓ Project overload
- ✓ Left alone, no support
- ✓ Burnout

(Heumann, 2016)

Nākotnes speciālisti

Mācīties un mainīties

Angļu valoda +

Stresa noturība

Komunikācija, darbs komandā, atvērtība, ieklausīšanās

Superspējas atrast un pamatot labāko risinājumu

Digitāls un sistēmisks domāšanas veids

Plašs redzesloks, holistiska pieeja, saskarņu pārvaldība

Dzīves cikla pieeja

Spēt ātri iedziļināties

Pacietība, ambīcija, cīņasspars

Būt gatavam kļūdīties

Projekta vadība, noteikt prioritātes, ieinteresēto pušu pārvaldība

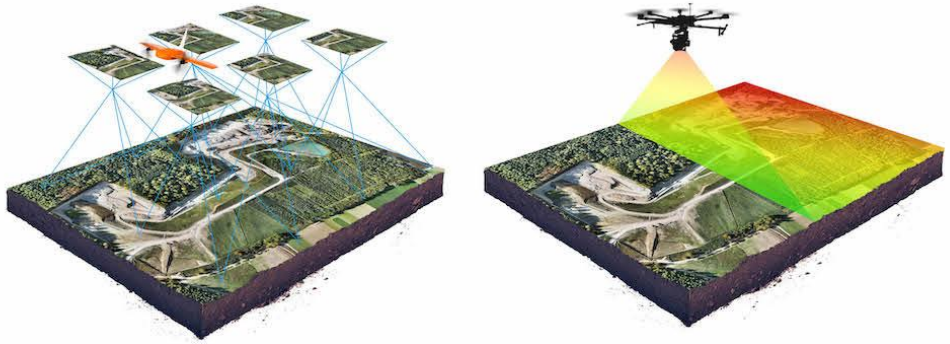
Vide, ilgtspēja, klimata pārmaiņas

Atbildība, precizitāte, disciplīna

Gatavība ceļot

Starptautiska vide

Nākotnes speciālisti



https://a-msurveys.com/3d-laser-scanning-lidar-surveys/

- Būvniecības un IT nozares saplūšana – būvniecības nozares digitalizācija
  - Projektu vadība
  - Būvdarbu vadība
  - Tāmēšana
  - Dokumentu vadība un pārvaldība
  - Programmēšana
  - IT sistēmu arhitektūra
  - u.c.
- Datu un informācijas drošība
- Sistēmu vadība un pārvaldība
- Liela apjoma datu apstrāde, analīze un simulācijas
- Bezpilota gaisa kuģu (dronu) vadība un apkalpošana, 3D skenēšana un photogrammetrija

Nākotnes speciālisti

OpenAI ChatGPT

Nākotnes būvinženieriem un dzelzceļa speciālistiem ir svarīga loma IT risinājumu izstrādē un pielietošanā, jo šajā nozarē aizvien vairāk tiek izmantotas digitālās tehnoloģijas, lai optimizētu darba procesus un uzlabotu efektivitāti.

IT risinājumi var palīdzēt uzraudzīt dzelzceļa infrastruktūru, plānot braukšanas grafikus, uzraudzīt kravas un vagonus, kā arī veikt apkopi un remontu. Būvinženieriem un dzelzceļa speciālistiem var būt svarīga loma IT risinājumu projektēšanā, izstrādē un testēšanā, kā arī to implementēšanā un uzturēšanā.

Turklāt, arī autonoma transporta sistēmas un citi jauni tehnoloģiskie risinājumi ir aizvien biežāk izmantoti dzelzceļa nozarē. Tādēļ, nākotnes būvinženieriem un dzelzceļa speciālistiem ir jābūt pietiekamiem IT zināšanu un prasmju, lai strādātu ar šiem jaunajiem risinājumiem un to pielietojumu.

Kopumā, IT risinājumi ir kļuvuši par neatņemamu sastāvdaļu dzelzceļa nozares attīstībā, un nākotnes būvinženieriem un dzelzceļa speciālistiem ir jābūt pietiekami sagatavotiem, lai darbotos šajā digitālajā vidē.

Būvdarbu pārvaldības procesos IT speciālisti un programmētāji parasti strādā ar šādām tehnoloģijām un programmatūras risinājumiem:

1. BIM (Building Information Modeling) programmatūras:

- BIM programmatūras izmantošana projektēšanas un būvniecības procesā, lai nodrošinātu datu integrāciju un pieejamību;
- BIM modelēšana un tās integrācija ar citām programmatūrām, piemēram, ar projektēšanas programmatūru un projektu pārvaldības programmatūru;
- BIM datu analīze un vizualizācija, lai nodrošinātu ieskatu projektu stāvoklī un sniegtu lēmumu pieņemšanas atbalstu.

2. Projektu pārvaldības programmatūras:

- Programmatūras izmantošana projektu pārvaldības procesos, lai nodrošinātu projektu izstrādi, plānošanu, uzraudzību un kontrolēšanu;
- Programmatūras pielāgošana projektu specifiskajām vajadzībām un procesiem;
- Projektu un uzdevumu vadība, projektu finanšu un laika plānošana, tāpat arī projektu dokumentācijas pārvaldība.

3. Datu analīzes programmatūras:

- Datu integrācijas un analīzes programmatūras izmantošana, lai apstrādātu un analizētu projektu datus;
- Datu vizualizācija, lai nodrošinātu ieskatu projektu stāvoklī un veiktu datu analīzi.

IT speciālisti un programmētāji palīdzēs arī izveidot automatizētus procesus un pielāgot programmatūru un tehnoloģijas konkrētajiem uzņēmumiem un projektu vajadzībām. Viņi būs iesaistīti arī datu aizsardzības un drošības nodrošināšanā, nodrošinot, ka jebkura datu apstrāde un uzglabāšana tiek veikta saskaņā ar noteiktajiem standartiem un prasībām.

How rail industry careers change in the future?

FROM

- Drivers
- Train guards
- Information points and ticketing offices
- Station staff at ticket barriers

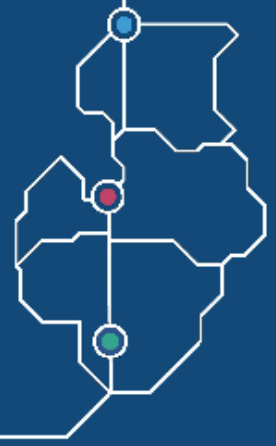
TO

- Big data analysts
- Cybersecurity experts, Security, Health & Safety
- Environmental change experts
- AI, IIoT and digitalisation specialists

Rail Baltica

railway-technology.com/analysis/railway-jobs-of-the-future/

Rail Baltica
Coordinated by RB Rail

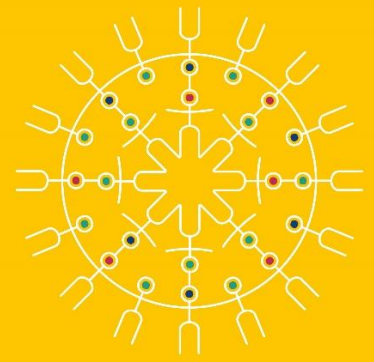


OUR VISION

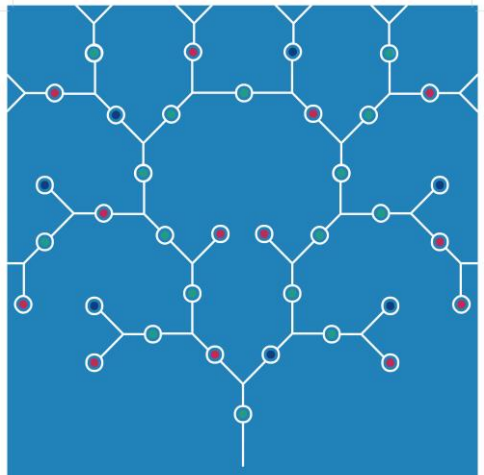
Connected Baltics in a connected Europe

OUR MISSION

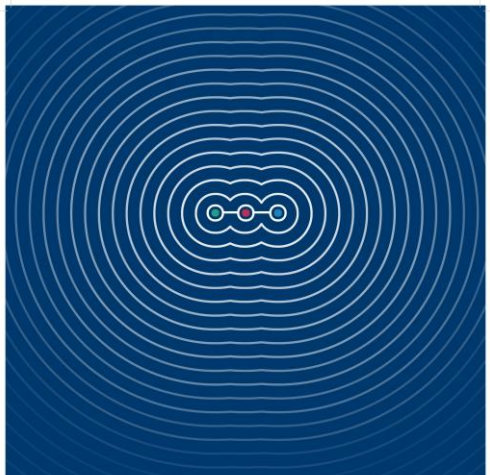
We are delivering a seamless mobility for people, goods and services to accelerate social and economic development in the Baltics and beyond



WE VALUE PEOPLE



WE VALUE PROFESSIONALISM



WE VALUE PURPOSE

Paldies!